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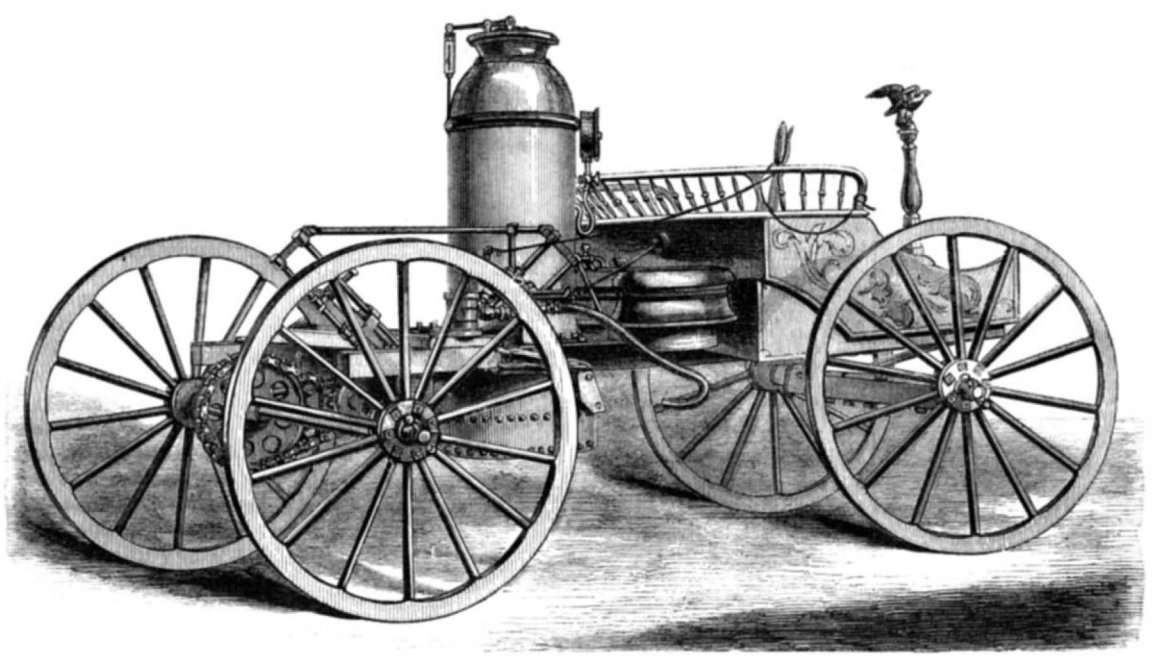
Improved Traction Engine.

It is well known that the traction engine is largely used in England for farm and draft purposes, but it has not yet assumed the same importance here. For agricultural labors Americans prefer the portable engine, and whatever efforts have been put forth to produce a traction engine have been mostly directed to the completion of a a successful road-running machine. The object, however, of the builder of the machines, one of which is represented in the engraving, is to produce a self-propelling steam carriage for running on common roads, or on the ice, and an engine that can be adapted to the work of the farm, to driving thrashing or other machinery, pumping from wells, watering gardens, and many other purposes.



WARE'S COMBINED STEAM CARRIAGE AND ENGINE.

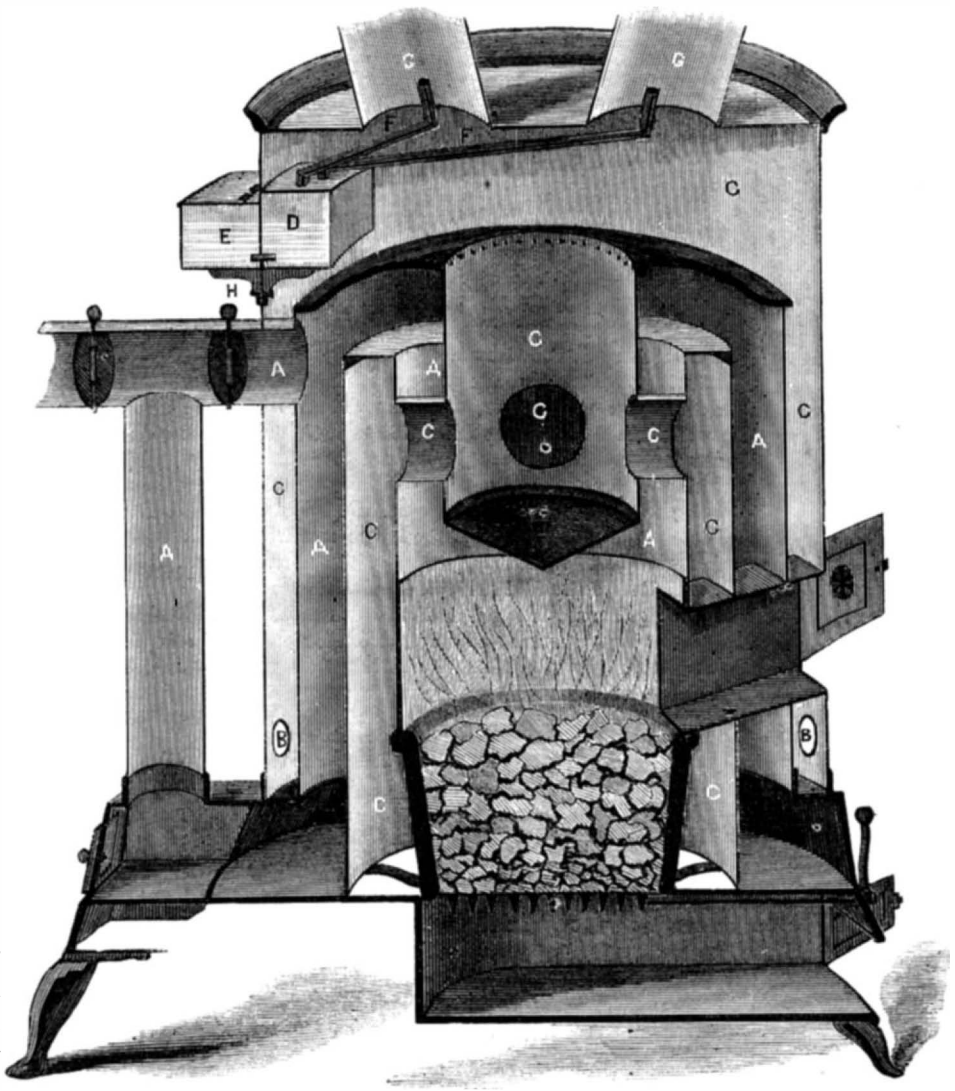
The appearance of the machine in one form is seen by the engraving. As a carriage it presents a graceful appearance. The boiler is hung between the forks of a frame of steel, which meet on the forward axle and thence backward diverge, holding the boiler suspended in the triangle thus formed. This frame of steel, edge up, is twisted a half turn on each side of the boiler, thus acting as a spring The engines work on an incline and drive a shaft with a chain wheel, which, by a machine chain, rotates the driving shaft and wheels. The engine is intended to give three revolutions to the first shaft to one revolution of the driving wheels, thus gaining power for ascending inclines. The difference can be multiplied to nine times. A lever in front of the driver's seat serves, by a simple mechanism, to guide the machine when used as a carriage, and a rod with handle connected to the engine shaft readily reverses the motion of the engine.

As will be seen, the machine is a complete engine in itself, capable of doing the work ordinarily done by the portable or stationary engine, and also adapted for locomotion. The inventor is confident that his machine can be made a success, as all those he has yet built perform their work admirably.

For further particulars address Elijah Ware, Bayonne, N. J.

Sanitary House Warming.

A few months ago we presented to our readers an engraving of the Whittingham Moist Warm Air Furnace, and herewith is an engraving of the Whittingham Moist Warm Air Portable Furnace, which is constructed of cylinders forming alternately annular passages for smoke and air, in such a manner as to utilize all the heat that may be generated in the fire-pot. The products of combustion pass through the passages, A, while cold air, introduced through the bottom of the furnace and holes, B, in its outside galvanized-iron casing, passes through the passages, C. By this arrangement a very large heating surface is obtained, and as it is a well-established fact that the heat to be realized from a furnace does not depend so much on the amount of fuel consumed as on the amount of heating surface the fuel is made to act upon—(air being a non-conductor of heat, receives caloric only by contact)—this furnace embraces every quality to enable it to heat a large volume of air economically, and can be manufactured at small cost. It is estimated that one of the size represented in the engraving (scale one inch to the foot) will heat a house 20 feet wide, 40 feet deep and four stories high.



THE "WHITTINGHAM" MOIST WARM-AIR PORTABLE FURNACE.

The water evaporator, D, placed in the upper part of the air chamber, is fed from the reservoir, E, upon the outside, and the vapor tubes, F, convey the vapor from it directly into the distributing air flues, G, thereby returning to the atmosphere the moisture it loses in passing through the furnace, thus rendering it mild and pleasant, instead of dry and arid. H and I are dampers, one, H, when open to give direct draft for lighting a fire, and when closed to change its course, and the other, I, to check the draft when required. J is a damper, of which there are three, to be opened for the purpose of cleaning the smoke passages.

The objections to furnace heat are happily obviated in the Whittingham furnace, as over its extensive heating surfaces an immense volume of air is warmed, and by the simple adjustment of the water evaporation into the air flues, the atmosphere is tempered to the mildness of a spring day.

Patented through the Scientific American Patent Agency, by Henry Whittingham, and manufactured by Wm. H. Church & Co., office and salesroom No. 211 Water street, New York City, of whom further particulars may be obtained.

BORAX---AMERICAN AND FOREIGN.

The recent development of this useful and interesting chemical in commercial quantities from the bed of a lake in California, naturally draws popular attention to the nature, uses and sources of the article. Its chief importance is in welding and brazing of metals. Applied to the heated surface, it at once dissolves the coating of oxide and protects the cleansed bright metal from further oxidation which would obstruct the union of the particles. It effects this by the eager affinity of its base (boron) for oxygen, with which it is always found in union, in the form of boracic acid, free or combined. The salt formed by three parts of the acid with one of soda, is the bi-borate of soda, commonly known as borax.

Boron is a very interesting substance. It is obtained chemically, in three conditions analogous to those of carbon, viz., as a dark-brown powder, a substance resembling black lead, and crystallized. The crystals constitute an artificial diamond, with the distinction that they are boron instead of carbon, some of them equalling the diamond in brilliancy, refractiveness, and hardness, though tinted with red or yellow coloring matter, and marred by laminæ of aluminum, from the boride of which the crystals are deposited. Being readily adulterated with common salt, alum, and phosphate of soda, the purity of borax is a question of practical importance with manufacturers. It has been found containing as much as twenty per cent phosphate of soda. The new California article, as we are informed by manufacturers who have tried it, is inferior in no respect but appearance, to the best imported. But as all borax is alike susceptible of adulteration, tests may well be employed by those who wish to produce superior work in metals. Alum may often be detected by the taste, and also by adding ammonia to a solution in water which converts the whole into a thick jelly by precipitation of the alumina. Litmus paper also reveals the acid reaction of alum in turning the blue to red. Phosphate of soda may be detected by exposing the borax to the heat of a drying room for a few hours, when the phosphate will effloresce, and may be picked out.

Borax is found in a crude state in Thibet and Persia, on the borders of certain lakes, the waters of which also yield it by evaporation. It also abounds in the great sandy desert extending inland from the coast of Peru and Ecuador to the Andes, and is here much mixed with borate of lime. The refining of crude borax has been carried on for centuries at various Mediterranean seaports, principally Venice, whence the general name Venetian borax, as applied to the refined article. Our importations of crude and refined borax, mostly the latter, as shown by the custom-house returns, amounted to 655,976 lbs. in the last four years, or an average of about eighty-two tuns per annum. But this amount is not more than one third of the quantity really imported, as the difference in duty has induced the importation of Italian boracic acid, to be manufactured here, by the addition, as above noted, of 33⅓ per cent of soda. Probably the average annual consumption in the United States does not vary very far from 500,000 lbs.: an amount which the California borax lake, if we may believe reports, is already yielding, with 300,000 lbs. more for exportation, and an unlimited supply in prospect. In consequence of this, the importation has virtually ceased. At the same time, the Italian article has been deteriorating for some time by the increase of foreign ingredients as yielded from the earth, and

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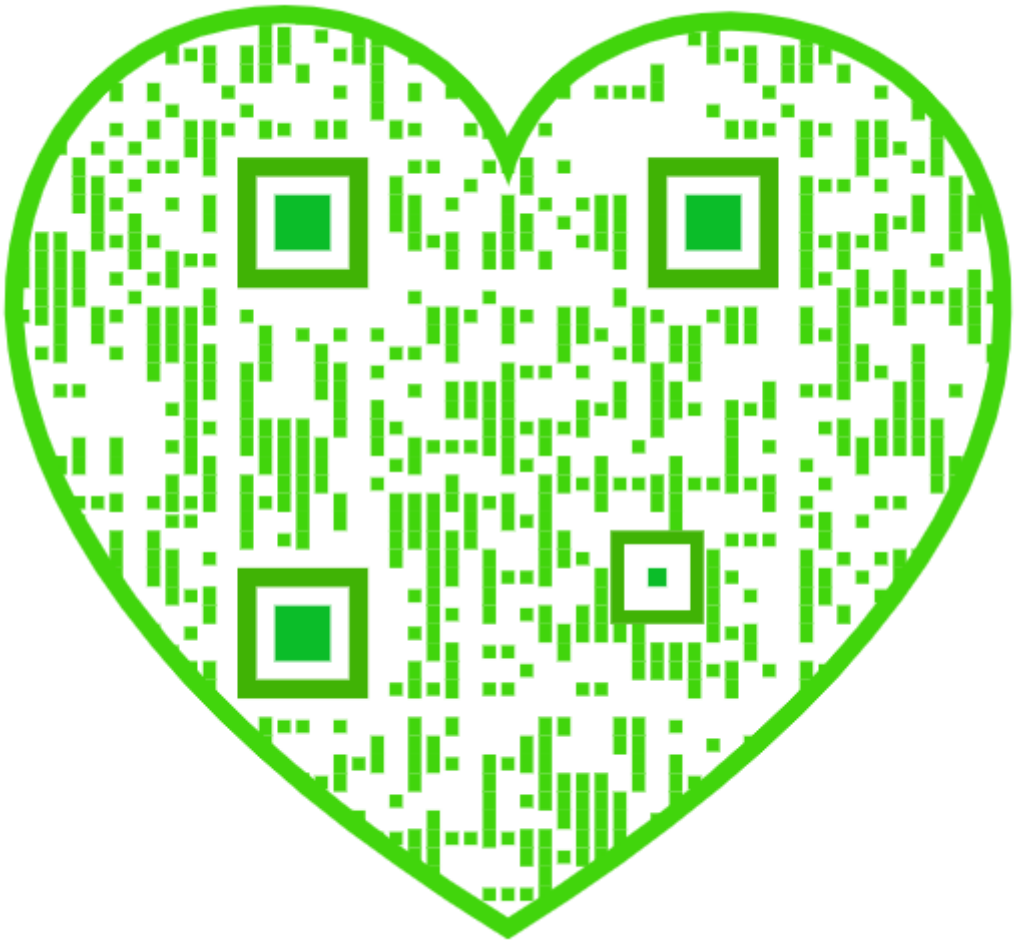

from this symptom an ultimate failure of the supply began to be apprehended.

The manner in which the laboratories of nature supply this article, is the most interesting part of our subject. It appears to be one of the choice ingredients which nature has reserved with peculiar care; for it is evolved only in a very few volcanic regions, and from its limited accumulation even there, would seem to be the product of comparatively recent and local volcanic action. The main supply of commerce, prior to the California discovery, was from the estate of Count Larderel, in Tuscany, where boracic acid issues from volcanic crevices in white clouds of steam and is arrested by the manufacturers in excavated basins of water which absorbs it and on evaporation leaves it in crystals, mixed with a great variety of sulphates and other substances. The evaporation is carried on entirely by the volcanic heat supplied with the article from the bowels of the earth. The product is sold by Mr. Edward Wood, of Liverpool, who has thus enjoyed a virtual monopoly of the trade, amounting to some 3,000,000 lbs. per annum, worth in first hands eight or nine cents per lb. It is worth about thirty cents in the American market.

The Tuscan boracic region covers some thirty square miles of wild mountain land, where the heated and undermined crust trembles to the boiling and rumbling of the waters beneath, and breaks open in numerous fissures, giving vent to jets of steam impregnated with the vapors of sulphur, boracic acid and other minerals. Wherever in solution with water, boracic acid is taken up with the steam on boiling; and hence the escape-steam from the innumerable safety valves of this great subterranean boiler, is loaded with the substance in question. Other and minor sources of supply may be named, as Sasso, and Vulcano, an island twelve miles south of Sicily, where it rises in steam from the bottom of the crater of an extinct volcano, 700 feet deep, and condenses on the interior like a perpetual accumulation of hoar frost or snow, underlaid with a bed of red-hot sal ammoniac.

Borax Lake, in California, occupies apparently the crater of an extinct volcano, elliptical in form, and about three quarters of a mile in mean diameter. It is situated on a peninsula embraced within the waters of Clear Lake; a sheet of water about twenty miles long, situated in the Napa valley, about one hundred miles north of San Francisco. The bottom of the smaller lake is full of borax, which is obtained by sinking iron coffer dams, exhausting the water, and digging out the earth. The borax crystals are picked out, the saturated earth is leached, and the lye evaporated. The formation of the bi-borate of soda is said to be constantly going on beneath the lake and impregnating its waters with carbonic acid liberated by the process. Sulphur banks in the same vicinity are worked with great facility from an unlimited supply.

REPORT OF THE REVENUE COMMISSION.

The report of the Special Commissioner of the Revenue, DAVID A. WELLS, is a document which every intelligent citizen of the United States owes it to himself and his country to procure and study. It is not a newspaper article, to run the eye over among other things. It is a work of science, research, and philosophy; condensed into a pamphlet, it is true, but containing more matter, more meaning, and more instruction, than almost any book, so-called, that we can think of among the publications of years. In respect to the amount of intellectual labor expended, of talent, experience and knowledge called into requisition from innumerable sources, and the number of collaborators employed and directed by one master mind, there are very few works in our libraries (except encyclopedias) that will really bear comparison with it. Mr. Wells has thrown his whole soul into his work, laboring with an enthusiastic industry, night and day, for years, and the result is a public service such as the country is rarely fortunate enough to obtain for its money, in any department. No man can be exactly right in all his conclusions, but if Congress shall legislate as well as Mr. Wells has advised, there will be little left to regret.

We would gladly give the report to our readers entire, did space permit. We can only glance at the main features, in the hope of inducing some of "the plain people" who govern the country at last, to make it their business to get and digest the whole.

It appears that the $50,000,000 lost to the revenue by the whiskey frauds and cognate operations which have pervaded the whole liquor business of the country, have not been saved to the drinkers, but have mostly gone into the pockets of manufacturers and knavish revenue officers. The average consumption being 40,000,000 gallons per annum, would yield at two dollars a gallon, a revenue of $80,000,000. Less than $30,000,000 were actually paid on only three-eighths of the amount made and sold; and yet the average ruling price, notwithstanding exceptional cases of which much has been said, has been nearly equal to the cost of manufacturing plus the tax, showing that in general the people have paid the tax, although their Government has not got it. From the enormous development of fraud and official dishonesty in the past year, perfected by practice and stimulated by the high rate of the tax, it results that the revenue from spirits has increased but about two and a half per cent from that of 1864, while the tax actually paid by the consumer has been four or five hundred per cent greater. The Commissioner recommends reducing the "swag" fifty per cent: in other words, making the tax one dollar a gallon. A still more important recommendation is renewed: that of supervisors of the revenue, with the duty among others of keeping the distillery inspectors in lively rotation from one sphere of inspection to another.

The tax on carriages, watches and plate, is condemned as too inquisitorial, annoying, and expensive to collect, in proportion to the revenue derived therefrom. The tax of three cents per pound on raw cotton, is recommended to be retained. The general tax of five per cent on products and sales of manufacturing industry, should be reduced to three per cent, with a proportional reduction of the specific taxes. The taxes on the manufacture of salt, emery, sulphuric acid, bar, plate and sheet iron, and on the elements of the manufacture of steel, to be entirely removed, and that on refined sugar to be reduced from two and a half per cent to one per cent. The decided opinion of the Commissioner is that a rapid reduction of taxation, rather than a rapid reduction of the principal of the public debt, is at present the true policy of the Government, and that the adoption of this course, so far from protracting the period in which the national debt can be discharged, will, on the contrary, greatly shorten it.

The taxes bear an excessive proportion both to the population and the public debt. The amounts for the late fiscal year were: Internal Revenue, $310,906,984, currency, and customs, $179,046,630, gold; a total of $561,572,260 in currency. Our domestic manufactures are taxed $178,000,000; business (licenses) $18,000,000 (gross receipts) $11,000,000; incomes, $68,000,000; banking, $12,000,000; stamps, $15,000,000. We pay an average of $16 04 currency, or $11 46 in gold, for every man, woman, and child in the country, while our public debt averages *per capita* $74 28. The worst-taxed country (ours excepted) in the world, Great Britain, pays $10 92, with a public debt of $125 *per capita*. France pays $7 97, and Austria but $5 27. The ratio of taxes to property with us is almost 4 per cent. In Great Britain it is nine-tenths of one per cent.

Furthermore, it should be remembered that taxes in Great Britain are levied in such a manner as in the least possible degree to enhance prices—all of the ordinary forms and products of industry being exempt from taxation; while in the United States the exemption of any form of capital or process or result of industry is the exception rather than the rule. Thus, in Great Britain, in 1865, 27·6 per cent of the revenue was derived from liquors and tobacco, while in the United States, with at least a double consumption, the per centage of receipts from the same articles was only 5·56 per cent.

The tax of 6 per cent on the woolen industry of Massachusetts alone ($48,430,671), was equivalent to nearly 20 per cent on the whole capital ($14,735,830) invested in this business; while the tax on boots and shoes was equal to 30 per cent on the whole capital employed, viz., $10,067,474. A revenue system like the above necessarily involves a most extensive duplication of taxes, which in turn entails and maintains an undue enhancement of prices; a decrease both of production and consumption, and consequently of wealth; a restriction of exportation and of foreign commerce, and a large increase in the machinery and expense of collection.

In respect to the tariff, it is shown that the average of duties is now 48·58 per cent, and 43·19 per cent on everything imported, not excepting gold: a very high average of rates, but so distributed in many cases as to tax our industry oppressively for its raw materials, while admitting the products of competing foreign industry on terms favorable to the foreigner and ruinous to ourselves. The increase of imports for 1866 above all previous years, is frightful: $437,638,966, against an average of about $300,000,000 for the seven preceding years, and an increase of over $200,000,000 from 1865. At the same time a table of exports is presented, showing the falling off in most of the leading branches specified, to be from fifty to seventy-five and even eighty five per cent. In the shipping business, the same disastrous picture presents itself.

The foreign commerce of the United States is being, as it were, swept from the ocean. No voyage with an American vessel can be planned at the present time from the United States to any foreign port with a reasonable expectation of profit.

The amount of American registered tonnage engaged in foreign trade in 1865-66, was but one million and a half tons (1,492,924), as compared with two and a half millions of tons (2,546,237) in 1859-60, which, allowing for the difference between the old and new measurement, indicates a decrease in five years of over fifty per cent. In 1853 the tonnage of the United States was about fifteen per cent in excess of that of Great Britain, while, at the present time, it is estimated at thirty-three per cent less.

Out of 191 American vessels engaged in South American trade in 1861-62, but thirty are remaining; while the number of foreign vessels engaged in the same trade has during the same time increased nearly threefold. The immediate cause of this change was undoubtedly the ravages of the Alabama and other Confederate privateers, but the destruction of property due to this cause would ere this have been repaired had the ordinary conditions of trade existed and the cost of constructing vessels continued unenhanced. Instead, however, of building ships as formerly for all nations, this branch of business has, to a great extent, been transferred from the Atlantic coast of the United States to the British Provinces; and on the whole Atlantic coast there have not been, probably, as many ships constructed during the past season as in the two British Provinces of New Brunswick and Nova Scotia.

The class of ships which cost at the present time, in the city of New York, about $100 per ton (currency) to build and equip ready for sea, do not cost much over $40 (gold) per tun to build and equip in the British Provinces.

Contraction of the currency is forcibly advocated. The circulating medium does not advance in the same ratio with the exchanges which it serves to carry on. In the State of New York, in the ten years from 1850 to 1860, the capital of banks increased 101 per cent, loans and discounts 75 per cent, deposits 113 per cent, and specie 141 per cent; while the circulation increased only 15 per cent. Before the war, the creation of currency in most of the States was free from any serious restraint. Speaking generally, therefore, the people of the United States had all the circulating medium which they required or would receive. And how much was it? Under this free system the utmost ever called for (and that in the fevered summer solstice of 1857) was less than two hundred and fifteen millions. Now the existing circulation exceeds seven hundred millions. The retaining of the present amount of currency in circulation tends to increase no business except what is speculative, and to check the very development which is expected to prove remedial of the excess. But we must refer the reader to the report itself for the full argument and the answers to all objections.

We reluctantly forego republishing Mr. Wells' masterly argument with the producers of crude commodities, that their interest, with that of all classes, demands the encouragement of manufacturing industries around them. The report must be left to speak for itself. It is unanswerable and exhaustive. We close with a few items of home interest, which every one of either sex will read.

ADVANCE IN PRICES.

A somewhat extended investigation respecting the advance in the prices of the leading articles of consumption and of rents, indicates an increase of nearly ninety per cent. in the year 1866, as compared with the mean of prices during the four years from 1859 to 1862. The advance in breadstuffs is estimated at about 70 per cent; coal (anthracite), from 60 to 70 per cent; salt fish, from 70 to 75; provisions (pork and beef), from 110 to 120; butter, over 100 per cent; rice, 100; salt, from 110 to 120; soap, from 80 to 90; brown sugars, from 70 to 80; coffee, from 30 to 40; and teas, from 140 to 150 per cent.

As regards textile fabrics, the currency prices of Domestic Cottons in October, 1866, show a nominal advance over the gold prices of such fabrics in July, 1860, of one hundred and seventy-two (172) per cent. The cost of manufacturing cotton goods in the year 1866, over the average of the years from 1857 to 1861, was 133¼ per cent. On manufactures of woolens suited for ordinary domestic use, the advance is estimated at 53 per cent. The advance in the price of ready-made clothing has been 50 per cent.

On silk goods in general, the advance is estimated at an average of a little over one hundred per cent.

As a general thing, the price of labor has not advanced in an equal ratio with the price of commodities, although numerous exceptional cases might be quoted which seem to indicate the contrary.

ADVANCE IN WAGES FROM 1860 TO 1866.

BRANCHES OF MANUFACTURE.	PER CENT.
Agricultural implements	55 to 60
Agricultural laborers in the Northern Middle and Western States, average	50
Bookbinding	37½ to 50
Boots and shoes—Men's	50
Women's and children's	25 to 33
First-class custom work, nearly	100
Car building—Skilled mechanics 60 to 75 per cent; average	60
Laborers and unskilled, 50 per cent; average	60
China decorating	60
Clothing—Ready-made	50
Custom work	95
Coppermining	100
Cotton manufactures—General average of all branches	66⅔ to 90
Furniture—Cabinet	85
Hardware—Files	43½
Locks	66⅔
Saws	75
Hats, wool and fur	60
India-rubber manufactures	80
Ink, printing	75
Iron—Founding	50 to 60
Rolling	75 to 80
Wire	75
Jute manufactures	89
Locomotives and machinery in Paterson, N. J., average	93
Machinery, cotton and woolen, average	60
General, average	60
Machinists' tools	68
Paper hangings—Machine tenders, and block cutters	50
Hand printers	72
Laborers	63
Printing—Composition	45 to 50
Saddlery and harness	62½
Ship-building	71
Silk trimmings, etc., nearly	100
Stereotyping	50
Umbrellas and parasols	47½ to 50
Woollen goods, miscellaneous	67
Carpetings	

[From our Foreign Correspondent.]

AMERICAN BREECH-LOADERS IN EUROPE.

BERNE, Switzerland, Dec. 3, 1866.

Permit me to tell you some things officially about gun matters in Europe, feeling that you will be interested in anything which concerns the introduction or adoption of American breech-loaders in European countries. I was present at a trial of arms in the month of October last before the Commission appointed by this Government to select guns for adoption, and found there Remington's, Spencer's, a variety of American systems for the transformation of muzzle-loaders, also a number of Swiss models for the same purpose, and some English (including the Snider), German and Prussian patterns, also the French Chassepot gun; in all some forty different arms: I presented the Winchester repeating rifle, formerly the "Henry." The final result of the trial and examination is, that the Federal Assembly, which meets to-day, is recommended by the Commission and the Military Department, to order for this Government the Winchester rifle for the entire army, 101,722, which with transformed muzzle-loaders will give the country some 200,000 breech-loaders, and in the hands of such riflemen as abound in this country, the Swiss army will be a terrible foe to meet. By the term "entire army" is meant all except the militia, who are furnished with the old transformed guns: the Winchester is adopted as a principle for the army, as a new arm. The report of the Commission on the trial to which I have alluded, gives the Winchester rifle the first place as regards accuracy of fire, rapidity, convenience in handling and freedom from liability to derangement of mechanism under the severest tests; and states broadly that it excelled all other rifles; and in accuracy, the results it gave were fifty per cent better than they had ever obtained with their best muzzle-loaders. The following figures give you some idea of the firing, which, it should be borne in mind, was done by firing from the shoulder, but resting the barrel on a stand, and with ordinary open military sights. At 300 paces, 30 successive shots, majority in a circle of 8 inches; at 400 paces, 30 successive shots, majority in a circle of 12 inches; at 600 paces, 31 successive shots, majority in a circle of 20 inches; at 800 paces, 40 successive shots, majority in a circle of 23 inches; at 1000 paces, 40 successive shots, majority in a circle of 48 inches.

The rifle was loaded and fired from the magazine 15 times in 41 seconds, including time of loading; and used as a single-loader, they found it could be handled with more facility than any other arm; in fact, taking the Prussian position for firing from the hip, the soldier need not look at his gun to load and fire it, but can constantly keep his eyes upon his enemy.

As an instance of the expertness of some of the Swiss riflemen, I would say that I have seen one of them with the Winchester military rifle, fire off-hand ten successive shots 583 yards, and the average variation of the shots on the target was only twelve inches from the center. The Chassepot gun, of which so much has been said, is no more nor less than another needle-gun, and the inventor whose name it bears, and who is a member of the French Artillery Examining Board, claims only the idea of inserting on the breech-pin behind the cartridge, a disk of india-rubber, which expands by force of the explosion of the charge, so as to prevent the gas from escaping behind. Notwithstanding the reported adoption of this gun by the French, I know that they are even more interested to see new arms now than ever before, and to my personal knowledge have not yet settled upon any model of that arm, as satisfactory.

The papers contain various rumors of the adoption of various arms by different governments; but, as far as I can learn from official sources, they are entitled to very little credit.

HENRY A. CHAPIN.

[Our Foreign Correspondence.]

UNDERGROUND RAILWAYS.

ENSWORTH, ENGLAND, Dec. 7, 1866.

MESSRS. EDITORS:—I have no practical engineering knowledge, therefore I must claim your indulgence if my note is somewhat confused. I had prepared a letter for your perusal on the subject of underground railways, but postponed sending it, and since then I have been repeatedly in the underground railway, and all the disagreeables which had been raised against this mode of conveyance I soon found to be entirely

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groundless. Nothing could possibly be more comfortable, agreeable, or perfect in its *modus operandi*, and I am certain every one in New York will enjoy this mode of transportation as much as we do here.

When the smoke and steam and breath of passengers were talked about, the idea occurred to me that the first two were readily removable by running the trains on two parallel lines on an incline, and by so weighting the descending one as to make it bring up the ascending carriages. Through telegraphic communication the required weight could be easily determined at both termini and at the intermediate stations.

There is nothing new in this mode of movement. In Brazil the system is followed, and an ascent of some 5,000 feet is surmounted by a series of zigzag inclines, and as the distances underground are short, the two sets of trains, united by a wire rope of one inch diameter, running round a drum or some such contrivance, with cramps to stop or check the trains, would operate satisfactorily, and if so, an enormous saving in engines and coal would be effected.

I venture to forward this suggestion to you, but whether it can be turned to any account I must leave others to determine. I cannot refrain from expressing the gratification I continue to derive from the perusal of your excellent hebdomidal.

THOMAS INGLE, M. D.

Editorial Summary.

SOCIETE D' ACCLIMATION.—This is a French association devoted to the arts of rearing and naturalizing foreign species. The encouragement of birds is one of their useful and amiable hobbies. Artificial nests are made a study, with such success, that the feathered tribes are said to accept the aid of man and willingly domesticate themselves in the habitations he has provided them rent free. Societies in Switzerland, for the protection of insectivorous birds, carry on this reverse sort of "bird-nesting" extensively. Certain species of birds settle from preference, as every child knows, in habitations provided by man; and there is reason to suppose that if all received the inviolable hospitality accorded to the red-breast and martin, it would be as gratefully accepted and repaid with music and beauty and bug-catching. There is, in fact, a remarkable affinity between the better nature of birds and of man. It has been observed that birds develop the gift of song only under the influence of human society. The calls of the wild birds of those vast solitudes which man has never civilized, are not, so far as we have ever learned, melodious, but consist in general of single notes, mostly sharp and shrill. Many insectivorous birds prefer for their dwellings the hollows of decayed trees. A gentleman of Vevay has united the picturesque with the useful, by interspersing such trees among those of his orchards. He has done this for twenty-five years, and has his tenements always filled, and his grounds swept clear of caterpillars.

ANTIQUARIAN DISCOVERY.—A Cornish journal tells a marvelous tale of a discovery by some workmen engaged in sinking a shaft at the Garden Tin Mine in Morvah, of a perfect pillar about eight inches in diameter, standing in the solid rock, and very different in its composition from the surrounding granite; and, stranger still, at the base of this pillar they have come upon what they describe as a wheel of the same material. The true composition of the supposed fossils is not referred to, but they seem probably to consist of some kind of columnar rock. If they were remains of art they would of necessity have belonged to a pre-Adamite race. Perhaps the fanciful resemblances observed may serve, as others have before them, to encourage in some credulous speculatists the notion of a fossil antiquity of man.

OIL IN BOILERS.—The interesting investigation given in a ate number of the SCIENTIFIC AMERICAN, of the foaming of boilers, is illustrated by an item in the French papers. A phenomenon analogous to foaming has become very troublesome on certain railroads in Belgium, where water is obtained for the locomotives from the discharge of collieries. At the pressure of six or seven atmospheres, the water is said to mix with the steam and escape through the valves in the form of mist, with such rapidity that the feed pumps are unable to maintain the supply, and the fires have to be drawn. It is attributed to coal dust in the water, containing oil. The correspondence between this theory and that of our contributor above referred to, will be noticed.

EDUCATION IN NEW YORK.—The amount of money appropriated in this State to public schools, during the year past, was $7,378,880. Four and a half millions of dollars were paid to 15,664 teachers. Of 931,000 children in the State, between 6 and 17 years, 919,000, or nearly 99 per cent, attended the schools—some portion, however, being outside these ages. The average attendance daily was over 43 per cent—the largest ever reported. It is proposed and expected to create in the legislature this winter a Metropolitan Board of Instruction for the city of New York, to replace the ignorant, corrupt and disgraceful body into which our elective commission has degenerated.

THE "GREAT EASTERN."—The French company who have chartered the *Great Eastern* as a tender to the Great Exhibition, are to pay, it is said, about $57,000 for the year, beside a share of the fitting up amounting to about $133,000, making $190,000 in all. Six hundred men are now employed on this work, and the ship is to be ready to proceed to New York on the 5th of March, and to return on her first trip early in April. The price of passage for the round trip will be $190; so that the first thousand passengers—one third of a full load—will settle the "rent." She will run from Brest or Cherbourg.

TINCTURES are solutions of vegetable and animal drugs, and sometimes of mineral substances, in spirituous liquids. The spirit most commonly employed is proof-spirit: sometimes rectified spirit is used, and occasionally ether. Ammonia is sometimes conjoined with the spirit, in which case the solution is termed an ammoniated tincture. Rectified spirit is alcohol, with 16 per cent of water, and its specific gravity is 838. Proof-spirit is composed of 5 parts of rectified spirit mixed with 3 parts of water, the resulting compound containing 47·5 per cent of water, specific gravity 920. The choice between proof and rectified spirit depends on their respective solvent powers over the active principles of the drugs employed.

IN 1866 the expenses of the city of Paris amounted to $46,000,000. In return for this seemingly large expenditure, the Parisians had the cleanest and best governed city in the world, together with an astonishing development of great improvements, in the opening of broad spacious streets, and in the erection of splendid public buildings. New York city expends about $18,000,000, and gets in return dirty streets, a brutalized swindling political ring, and no improvements that are worth mentioning. During the past ten years enough money has been stolen from our burdened tax-payers, to have furnished this city with museums, art galleries, monuments, etc., that would have attracted the attention of the whole world.

PEAT AND PETROLEUM.—A method of applying petroleum as fuel for locomotives, has been patented by a Mr. Gartshore, of Dundas, C. W. It is rumored that the Great Western Railway propose to try it.—The new arrangement for burning peat in locomotives has been adopted by that company, which has entered into a contract for considerable quantities of the fuel.—The oil mining is not all bubble, as shown by the receipts at Pittsburg in the first eleven months of 1866, and reported at nearly a million and a half of barrels, or more than double the receipts of the corresponding months of 1865.

A SIMPLE device has been patented in England for disinfecting and deodorizing the effluvia from sewers, drains and sinks. It consists of a wire screen filled with charcoal or other disinfectants, and placed so as to occupy the only outlet for the noxious gases, and compel them to pass through it. The same contrivance may also be placed in the rain pipes, so as to pass all the rainfall from the roofs through the disinfectant into the sewers. The London Board of Works adopted this plan during the late visitation of cholera; with what effect has not been reported.

DIRECT EXPORT OF PETROLEUM.—It is manifestly cheaper to export petroleum by itself, in vessels where it can neither endanger nor injure less hazardous and more delicate merchandize. So the Erie exporters believe, and have formed a company for direct transportation of the oil from that port to Europe. A fleet of vessels of 400 tons is to be employed, carrying 2,500 barrels each, and making three trips a year. The saving in freight is estimated at two dollars per barrel.

ILLINOIS AT PARIS.—The Illinois Central Railroad Company has exerted itself with praiseworthy liberality to place an exhaustive representation of the State in the great Ehibition; and will make a good thing of it. Being proprietor of vast grants of land on its line, the company will "coin money" from Europe by showing up the rich soil in bottles, with the tall corn, the matchless grain, the spontaneous pork, and the sweet sorghum in all stages of its growth and manufacture.

THE TALLOW TREE.—The product of this tree, which is a great article of commerce in the northern part of China, gives an excellent light, free from smoke and smell. It is prepared from the seeds. The tree is very prolific and rapid in growth, and yields a valuable wood, as well as a dye from the leaves. In the government plantations on which it has been introduced lately in India, trees eight years old from the seed are now six feet in circumference.

PROFESSOR H. DUSSAUCE, Chemist, U. S. Commissioner to the Paris Exposition, wishes to communicate with exhibitors, as he desires, in connection with his position, to obtain authentic information concerning the Exposition any one may contemplate making at Paris. This information is to be used in the report he will make upon the subject of American industry. He can be addressed at New Lebanon, N. Y.

ROWS of strong-growing evergreens, such as pine, cedar, and spruce, especially the beautiful tree last named, are equally useful and ornamental during the cold winters of our climate. Their rich and thick green, mantled with ermine, at once charms the eye and protects the home of man from the severity of the winds. Judiciously disposed, they will save a large proportion of the fuel and doctor's bill.

COFFEE GAS.—If ground coffee be mixed with cold water, a gas is evoked about equal in volume to the coffee; and if mixed in a closed bottle, filling it, the gas will burst the receptacle. M. Babinet, who observed the fact, does not mention the composition or properties of the gas. Will some of our chemists examine it?

WE have received some samples of cassimeres manufactured by the Willamette Woolen Manufacturing Company, Salem, Oregon. The prices range from $1 30 to $1 75 per yard, and are pronounced by those familiar with the trade, excellent.

THE Dunn Edge-tool Company of West Waterville have recently occupied a large new factory, in which their production will be increased next year to 12,000 dozen scythes and 2,000 dozen axes.

WARM CURRENTS OF AIR.—The Colorado *Transcript* notices the phenomenon of remarkably warm currents of air from the southwest, which cross the valleys of the Vasquez Fork and other streams, during cold weather, affording a striking contrast to the cold atmosphere of the surrounding prairies, extending as far north as 44° in Montana Territory, and sensibly affecting the climate and productions on the Tongue, Wind, Big Horn and Rosebud Rivers. The natural supposition that they come from a warmer climate, to the southwest, is rejected on the ground that snow-covered ranges of mountains intervene, over the tops of which the warm air of the south would be lifted by its rarefying temperature. Can any of our philosophers explain it?

TURPENTINE FROM PETROLEUM.—Since the pine product of North Carolina was suppressed by the civil war, we have missed our old convenience for paint and light, and come into possession of one still more disagreeable in its odor and effects. But recent scientific experiments in England, it is said, have proved that turpentine can be extracted from petroleum by a safe and cheap process, at one third of the old price of the Carolina article. Perhaps the manufacture of turpentine from the pine may prove to be one of the things permanently abolished, though indirectly, by the war.

ARTIFICIAL SILK.—In noting the process of resolving the silk fiber into the original gum from which the insect spins it (see SCIENTIFIC AMERICAN, vol. XVI., page 4), the conjecture occurred to us that the same substance might yet be obtained direct from vegetable nature and spun without the aid of the silkworm. We thought it too visionary an idea to mention, at the time, but we have since seen the statement that another Frenchman, one Lucien Tracol, has found means to realize it. His process is not disclosed. Still another, M. Brunet, is said to have succeeded in spinning silk from the fiber of the mulberry bark.

MAKING STEEL RAILS CHEAPER.—A method has been adopted of uniting iron and steel in the construction of rails, so as to obtain the advantages of steel on the faces, while making the stem mainly of the cheaper metal. It has been found impracticable to weld the two satisfactorily, and this difficulty is now obviated by connecting the two steel faces by a thin steel plate, like the letter H; thus making a complete rail of steel, except that the stem is slight—a sort of skeleton stem—reinforced with a sufficient thickness of iron rolled on each side to give the necessary strength and stiffness.

A LONG SPEECH.—Messrs. Little, Brown & Co., of Boston, are now publishing the works of Edmund Burke—ten volumes having been issued. Two of these volumes are filled with the charges and speech against Warren Hastings, Governor of India. The charges embrace 325 pages, and the speech covers 615 pages, and appears not to have been concluded in the volume before us. The orator must have tired out the patience of his hearers. The trial, however, lasted some seven years.

THE new textile lately discovered in Nevada, is closely similar to hemp, but has a stronger and finer fiber, and a much longer staple. In proportion to the wood, the fiber also is more abundant, and can be more readily separated than flax or hemp. The plant grows in large quantities in the Humboldt Valley, but is capable of being cultivated in our Northern and Eastern States.

GLYCONINE.—A mixture of four ounces of the yolk of eggs, with five ounces of pure glycerin, forms a preparation for soothing the irritation resulting from burns. The compound forms a sort of varnish, protecting the surface of the skin from the action of the air, and can be easily washed off when desired.

AN English inventor proposes to use potash as an auxiliary in the reduction of limestone, producing a caustic alkali of special virtue as a disinfectant wash and a preservative of stone and metals. He also claims the use of the carbonic oxide thus liberated, for the conversion of iron into steel, nder Bessemer's patent, and also for adding to the value of substances intended for manures.

PINS AND PENCILS.—Thirteen millions of black lead pencils are made annually in Keswick, England, alone. Nuremberg exports, annually, twenty millions of Faber's lead pencils. Fifteen million pins go daily, nobody knows where, from English hands.

PARAFFINE PRESERVING.—Immerse fresh meat in paraffine, at a temperature of 240 degrees, long enough to effect a concentration of the juices and expel the air to the extent of its expansion. Then cover the meat with a coating of paraffine, to exclude the air.

THE bakers of London have made arrangements to issue a paper called "The Staff of Life." An organ of sound morals, science and art, in bread making, is a desideratum among American bakers, and might be useful in many other ways.

THE PARROTT GUN CASE.—The suit of Mr. Treadwell, against the Parrott gun patent of which we noticed the points, has been dismissed by Judge Nelson, confirming Mr. Parrott's title as the original inventor.

CHEAP ROUGH PAINT.—Hydraulic cement, six parts; fine beach sand, two parts; salt, one part; mixed with water to the consistency of cream, and applied to a rough surface.

THE sugar crop of Liberia—a settlement almost left for dead, not many years ago—is estimated at 4,211,200 lbs. for 1866, of which 2,000,000 will be exported.

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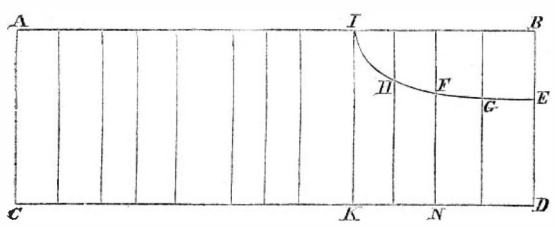
EXPANSION OF STEAM.

An engine is working on the "expansive" principle when the steam does not follow the piston its full distance through the cylinder or when the steam is "cut off" before the end of the stroke; that is, when the communication between the steam already in the cylinder and that in the boiler is closed.

It is clear that the steam in the cylinder will do some work by expansion during that part of the stroke which is uncompleted after it is cut off, and this work (which is done without any further supply from the boiler) is the saving of steam, and consequently of fuel, due to the expansion of steam.

This saving of steam and fuel is diminished to a small extent by a loss of power. For if we have a boiler carrying a certain pressure of steam, and the engine just does the work when using steam full stroke, it will be necessary to have a larger cylinder or increase the pressure in the boiler in order to do the same amount of work "expansively," and this will be attended with a saving of fuel in both cases on account of the expansion, and in the latter case there will be an additional saving from the fact that the greater the pressure under which the steam is produced, from a given amount of fuel, the greater the amount of work which can be developed from it. In order to illustrate this, it will be necessary to explain what work is, and the manner in which it is represented graphically. Work is the product of the resistance multiplied by the distance which it moves through. For instance, if there are ten one-pound balls to be moved the distance of one hundred feet, the total work to be done is said to be one thousand foot pounds: if they were moved one at a time, the work each time would be one hundred foot pounds, and in ten times, one thousand, as before. As the area of a rectangle is the product of two factors, viz., two of its sides, it may be taken as a graphical representation of "work" by considering one of its sides to represent the distance through which the resistance moves and the other side to represent the amount of this resistance. In the figure, let the line, A B, be the distance, and A C, the resistance: then the area, A B C D, will be the work done. Hence if we suppose A B to represent the stroke of an engine, and A C the pressure throughout the stroke, the area, A B C D, will show the work done during each stroke. If the stroke be three feet = A B, and the pressure twenty pounds, the work of each stroke will be sixty foot pounds = area, A B C D. When the steam is cut off at any point as at I, the steam will commence to fall in pressure as represented by the lines between the curve, I E, and the line, K D. The work done by the expanded steam will be shown by the area, A C D E I, the work lost, by the area, I F E B, and the work saved by the area, I F E D K. In order to determine these areas it will be necessary to find the average length of the lines between the lines, A I E and C D.

We are enabled to do this by considering steam a perfect gas (from which there will be no appreciable error in practice if the expansion is not carried beyond limits to be mentioned hereafter), and consequently being less in pressure as the space it occupies is larger. If the stroke be three feet, as before, and the steam be cut off at I, two feet from A, the steam will occupy one and a half times greater space at the end of the stroke than it did when it was cut off, and the pressure will be one and a half times less, that is $20 \div 1\frac{1}{2} = 13\frac{1}{3}$ pounds = D E.



At a point, F, half way between point of cutting off and end of stroke it will occupy one and one quarter times as much space as it did before, and the pressure will be one and one quarter times less, that is $20 \div 1\frac{1}{4} = 16$ pounds = N F. By proceeding in a similar way we find the pressure at H to be $17\frac{2}{9}$ pounds, and at G, $14\frac{6}{11}$ pounds, and at each of the points before cutting off, twenty pounds, and hence the average pressure will be $[8 \times 20 + 17\frac{2}{9} + 16 + 14\frac{6}{11} + 13\frac{1}{3}] \div 12 = 18\frac{1}{2}$ pounds, and the area A C D E I, or work done $= 18\frac{1}{2} \times 3 = 55\frac{1}{2}$ foot pounds. The area, I F E D K = work saved $= 55\frac{1}{2} - 40 = 15\frac{1}{2}$ foot pounds. The area, I F E B = work lost $= 60 - 55\frac{1}{2} = 4\frac{1}{2}$ foot pounds. From which we find that the steam, in expanding to $1\frac{1}{2}$ times its original bulk, does 37 per cent more work than when following full stroke. The work, however, when working full stroke, was 10 per cent more then when cutting off at two-thirds stroke, hence we must use more steam in order to do as much work as before. The additional amount of steam required will be 7·3 per cent (and not 10 per cent, which is the amount of work required) because the steam which we add to bring up this loss of work acts expansively with that we have been considering, and therefore does 37 per cent more work than if it followed full stroke; and 37 per cent of 10 per cent is 3·7 per cent. The total saving of steam working expansively one-third of the stroke, is therefore equal to the first saving of 37 per cent less the 7·3 per cent which must be added in order to lose no work, or nearly 30 per cent. From the above it appears that the use of high steam and a large use of the expansion principle, would be attended with great economy, and, in fact, wherever the power required is nearly uniform, as in manufactories and on smooth rivers and lakes, this principle is almost universally adopted. There are, however, cases in which it is impossible to get the full benefit of expansion.

In locomotive and propeller engines, owing to the simplicity of the machinery required to run smoothly at high speeds, it is limited to the link motion, with which it is impossible to cut off advantageously before five-eighths of the stroke has been completed. All slide valves are limited in the extent to which they can cut off advantageously by the same cause which limits the link motion, viz., a choking of the exhaust, causing excessive "back pressure" or else an early release of the steam behind the piston before the stroke is completed.

The extent to which expansion can be carried economically is limited. When steam expands from a high to a low pressure and does no work but simply enlarges its volume, it is superheated, that is, it is of a greater temperature than steam which has been produced at the lower pressure. If, however, the steam performs work in expanding, such as driving the piston of an engine, part of the steam will become liquefied, thus showing that its temperature has been lowered. This fall in temperature is not of practical importance unless the steam is expanded to more than three and a half times its original bulk, which doubles its efficiency, when it cools the surrounding cylinder to a considerable extent, and thereby condenses the steam of the next stroke until the metal is brought to its temperature, soon after which it is again cooled by the expansion of this last steam. The greater part of the water formed in the cylinder while the engine is in operation is now attributed to this condensation, and not priming or foaming, as heretofore.

From what has been said, it is clear to see that steam used expansively is an economical practice, and should be so used to some extent in every case, and especially where the first cost, weight, and bulk of the machinery are of little importance compared with the fuel to be consumed.

HAINES'S SAFETY BRIDLE.

We have published several engravings with explanations of improved reins for driving, designed to obviate the annoyance to the horse of the common unyielding check rein, and to secure the occupants of a vehicle from the dangers of hard-bitted and fractious animals. The two engravings show the construction and action of an improved rein patented by Joseph C. Haines.

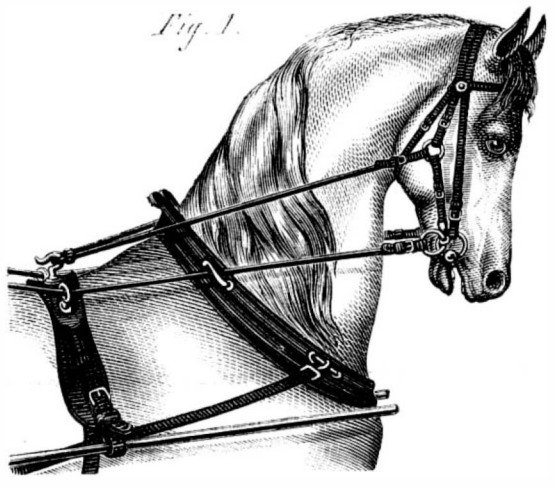
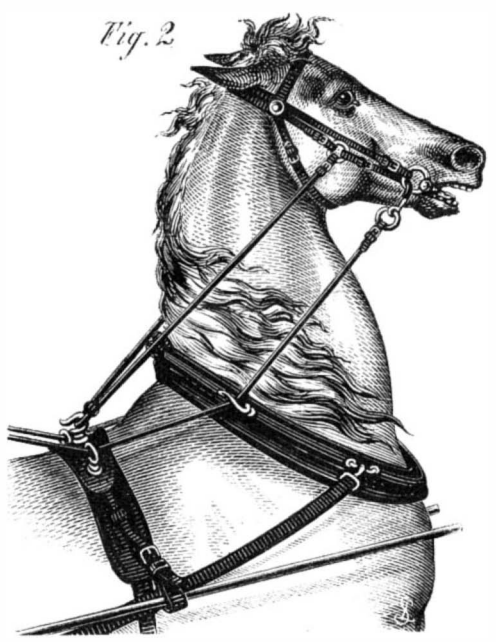


Fig. 1 shows the harness as it is in ordinary driving, and Fig. 2, the reins when used to check a refractory horse. By a glance at either of the figures it will be seen that the reins proper and the check strap are united by means of a strap parallel with the headstall. In ordinary driving, however, the rein ring is held close to the bit ring, as in Fig. 1, by



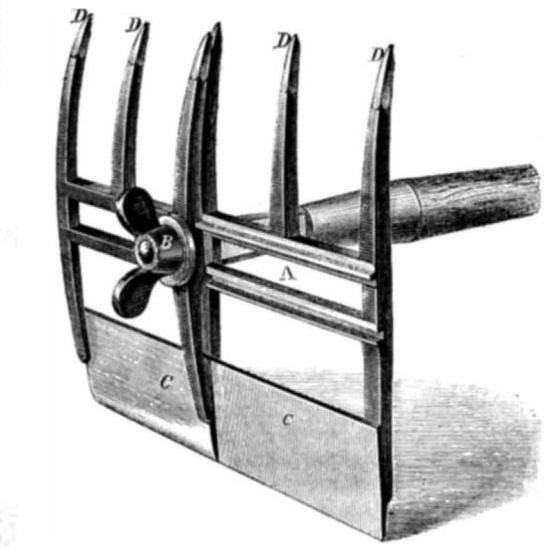
means of a bent metallic connection between the rein and check which makes a bearing on the bit ring. But when it is desirable to bring the horse up "standing," a powerful pull on the reins draws the rest through the ring, and straightens the head-stall strap, bringing the head up and effectually controlling the animal, as is seen in Fig. 2. The fixed point of attachment at the top of the horse's head forms a fulcrum against which a powerful leverage can be exerted, sufficient, it is claimed, to control the hardest-bitted horse.

The bearing used at the bit ring in ordinary driving may be of metal, or of the leather itself, recessed to fit the ring. The arrangement has been fully tested and is said to be satisfactory in its operation.

Patented July 10, 1866. For the right to use, manufacture, and sell, address J. C. Haines, Lewiston, Pa.

RENZ'S EXTENSION WEEDING HOE AND RAKE.

The object of this device is to provide a simple garden implement, which can at will be changed in size and form to subserve several purposes. The frame is of cast or malleable iron, connected to a handle by means of a screw shank, which slides in the slot, A, and secured in any position by the thumb nut, B. Over this frame is a corresponding one, the central



bars of which are rabbeted to receive the slides of A. Each frame has a steel blade, C, and rake teeth, D. When fully extended, the two blades form one of considerable length, and the rake is open, as shown in the engraving. If the outer frame is slipped half the distance between the teeth, it makes a narrower blade and a rake only one-half as coarse as when fully extended. The whole frame can be secured by the center or near either end. Any adjustment desired can be made instantly.

Patented through the Scientific American Patent Agency, Dec. 4, 1866. For further information address Mitchell Renz, Naugatuck, Conn.

NEW PATENT PIN.

The phrase "pin money" is to us of modern days a meaningless term, but if we go back to the time when the expression originated, we find it had a painful significance, for prior to the introduction of the machinery for their manufacture, a pin made by hand was in value a synonym for a penny. The extravagance in the use of pins at the present day is incredible. The statement is given in another column of the number daily manufactured in England, and as the demand shows no decrease, we can estimate the number lost annually.

The annexed engraving shows a new article in this line, which will remain in position when once placed, and not injure the fabric. The improvement is in forming the shank with one or more swells or enlargements, beginning at or near the point, and terminating in square or beveled shoul-

ders, or, if designed to be permanently placed, as in fastening papers together, the expanded portion is provided with barbed points, so that if once inserted it cannot be withdrawn. By using this pin, no anxiety need be felt by the ladies lest some article of apparel should become unpinned.

Patented Dec. 11, 1866, through the Scientific American Patent Agency. [See advertisement on last page.]

Pain of Decapitation.

Dr. Guillotin, who from humane motives proposed in the constituent Assembly of revolutionary France the adoption of the mediæval decapitating machine which bears his name, supposed that death by this agency would be attended with the least possible suffering. Others maintained the contrary; but his opinion prevailed, and has been generally accepted. Latterly, however, the French Academy of Sciences has reviewed the question. Experiments made some years ago in the shambles of Paris proved that, although sensation must be instantly paralyzed below the division of the spine, yet the sensorium continued active for more than one minute. The facial muscles were agitated with violent convulsions, the respiratory organs of the face worked, the mouth alternately opened and closed, and the animal appeared to experience intense agony, and an imperative desire to breathe. The eyes also retained their sensibility, shutting at the approach of a finger, and then opening, as in life. The anecdote is therefore not wholly incredible, that on the beheading of a state prisoner in England, when the executioner, according to custom, held up the head, with the words: "This is the head of a traitor," the mouth of the still living head ejaculated the answer: "That's a lie!" Whether the vocal organs could, by any possible effort, draw through the severed windpipe a sufficient current of air to form a sound, the learned might perhaps be able to judge. That after decapitation the head is still the living man, for some moments, seems to admit of no doubt.

A Great Fossil.—Montana contributes to palæontology a molar of three pounds weight, in a fragment of jaw bone five feet long and weighing fifty-seven pounds. It has a marvelous snarl of roots, likened to "a cluster of four beavers' claws, overlapping each other." It is in the possession of Mr. Elliott, of the Montana *Post*.

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Correspondence.

The Editors are not responsible for the opinions expressed by their correspondents.

Tea Culture in the South.

MESSRS. EDITORS:—An article in your issue of December 22d, induces me to send you my experience, etc., in the tea culture. During the war I was living in Fayetteville, N. C., and there tried the tea plant with success. The general soil of that section is sandy, with an understratum, more or less deep, of clay. The seeds I planted were old, but they sprouted well, and in March, 1865, I had over a hundred fine plants, averaging eight inches in hight. At that time my fence was destroyed by the accidents of war, and I paid but little attention to the plants until June, when I found many still flourishing. Dr. Saml. J. Hinsdale, of that place, transplanted them to his garden. He has now many fine large shrubs of the tea tree, and has prepared tea therefrom. The soil of that section is well adapted to the growth of the plant, and land can be bought there very cheap. I presume Dr. Hinsdale could give more full information of his own experience. I know that the seeds were distributed by him, and that dozens of persons planted them with success.

Dr. Smith, near Greenville, S. C., spent much time and money experimenting with the tea plant, but I do not think the soil he had to deal with so good as that further south and east. He, however, said that good tea could be produced there at a comparatively small price. There is no doubt that thus growing the plant is the only way it can be had pure.

On the eastern shores of North Carolina grows wild a shrub tree called Yopon—name no doubt derived from the Yeopim Indians—to which botany has given the name *Ilex Euponia*. It is very similar to the Matte (*Ilex Paraguayensis*) of South America. It is crudely cured and used as a tea by the poorer classes and boatmen. Its chemical properties are similar to black tea, while its medicinal are superior. As a sedative in fevers it has no equal. In excess, it acts on the liver and also produces vomiting. The leaf is of the same shape and size as Chinese tea, and from appearance no one can tell any difference in the two plants at eight or ten inches hight. When full grown and large I think the yopon has a slightly thicker leaf; but of this I am not a fair judge, as I have seen yopon shrubs fifteen feet high, while I have never seen a Chinese tea plant more than two feet in hight. I have no doubt but with equal care the wild shrub of North Carolina would make a tea as good as ever came from China, while, too, I have no doubt much of the "pine barrens" of eastern North Carolina might be made to yield an immense profit, cultivated in tea plants. Thousands of acres of such land, from which the turpentine has been worked, can be bought for 25 or 50 cents an acre, while much equally fit for corn, etc., with turpentine and timber trees, can be bought at from $1 to $3 per acre.

Brooklyn, L. I. H. E. C.

Saws for Sawing Metals.

MESSRS. EDITORS:—As your readers have lately been instructed how best to treat circular saws for the purpose of sawing wood, perhaps you would not be averse to give those of your readers who deal in metals an opportunity to give the results of their experience in the use of circular saws for sawing metals.

I have lately had occasion to saw from round brass bars seven eighths inch diameter a large number of pieces half an inch thick. To do this expeditiously, I constructed a circular saw of 3 5 inches diameter, 10 teeth to the inch, to which I gave 6,440 revolutions per minute, equal to 1,064 per minute at the cutting edge. At this speed I succeeded in sawing about 100 pieces per hour; two thirds of this time, however, was consumed in grasping the bar after each cut, close to the new cut, and in filing the saw. I found it necessary to keep water dripping on the edge of the saw to prevent heating, and had to sharpen frequently. The use of water I believe to be unnecessary if the saw were properly made. My saws were made of No. 18 sheet steel. They were hardened by being rapidly placed when red between two blocks of smooth iron; the temper drawn from the center as usual: this was the only way I could prevent warping. The temper, however, was always uneven and the corners of the saw teeth were frequently destroyed.

How should and how can such saws (of No. 24 steel if possible) be made to have clearance of teeth, even temper, and true surface?

I am aware that circular saws are used for the purpose of sawing iron; as for sawing rails, for instance. I have used circular sheet iron disks without teeth, run at high velocity, advantageously as saw blades for thin pieces of iron, and steel blades with teeth, at low velocity, to saw the slot in screw heads, etc. Will you or some of your readers familiar with the subject publish their experience in this line for the benefit of probably thousands of your readers. EUGENE BANDEL.

Benicia, Cal. Dec. 13, 1866.

Petroleum as a Lubricator.

MESSRS. EDITORS:—We all remember the prejudice that petroleum encountered in its introduction as a burning oil. But there was no denying the splendid light it made, and hence it triumphed. The heavy petroleum has encountered less prejudice as a lubricator, but still it meets with opposition from many machinists and engineers, greater perhaps in the East than in the West. Can any of these engineers give a consistent reason for this opposition? Said an engineer to me, "We don't like it so well as lard or sperm, but admit it is cheaper, and in winter will not freeze on a locomotive." When asked the ground of his dislike, after conceding its cheapness and utility, he could only plead its color and smell,—a mere matter of taste, that the stockholder in a railroad cares very little about. This prejudice is encouraged of course by refiners and dealers in manufactured and other oils, who besiege the master mechanics of railroads, and other great consumers, with every variety and quality of oils, half of which are worthless.

Some machinists will say, however, they have tried the earth oil and found it *gritty*. They were simply unfortunate in their purchase, just as they often have been in buying other oils. Earth oils vary in quality, and it is to be regretted that dealers in the cities do not identify better the wells they buy from, and establish the reputation of those that stand the test of use, and throw out those that do not. But they seem to note only the gravity. Some wells do produce a gritty oil. The large wells on White Oak Creek, West Va., produce an oil less pure than the small wells that pump some water. This oil is now being clarified with success. The Ohio lubricating oil varies least, and is the purest produced. These wells are all small, and pump from twenty to five hundred parts water to one of oil. This is true of the Muskingum wells, and indeed of all Ohio wells within my knowledge. The oil, also, appears to be intrinsically of finer quality, of a darker green, and less pungent odor. The production however is limited, and notwithstanding, owing to the want of discrimination as to quality in the market, it suffers in price except with those who know the difference in quality from use. The same discrimination used in the purchase of other oils, will secure a pure earth oil.

There have been many comparative tests of petroleum made, and all in favor of the earth oil. The most accurate and systematic, perhaps, were made by the Michigan Central and the Boston and Union railroads. The former showed that petroleum is 38 per cent cheaper than whale oil; the latter, that the consumption was 20 per cent less in quantity in going 19,000 miles. The captain of a steamboat who had used the Ohio oil for years, told me his experience proved one barrel of it equal to two barrels of lard oil, while his machinery was always clean and ready for use, no matter how long his boat was laid up. In fine, I have observed that after prejudice is worn off by its use, engineers invariably pronounce petroleum the most economical oil. Its price is now so much less than all other oils, there is every inducement for railroads and other great consumers, not to mention the smaller ones, to give it a fair trial. MECHANIC.

Tempering and Sharpening Steel.

MESSRS. EDITORS:—Tempering a tool consists commonly in giving it a hardness greater than required, and then softening it by again bringing the metal to the action of the heat. This heating is variable, according to the softness required, and steel possessing then the faculty of covering itself with a very thin stratum of oxide of iron, the color of which varies with the degree of heat, the mechanic wants only to follow the indications of the thermometer for operating surely.

At 430° F., pale yellow; 470°, gold yellow; 490°, brown; 510°, purple; 550°, bluish; 570°, indigo (blue); 610°, water green. Hence the expressions, to "heat to a blue," etc.

As proved by your correspondent "I. E. E.," the stratum of colored oxide is of no consequence to the temper. He removed it with diluted acid, and the former elasticity remained. He, like correspondent "E. P. W.," found that loss of elasticity resulted from the polishing and grinding of blades. The softening proceeded from the heat occasioned by grinding and polishing. By heating your blades again, you temper them more and more. By sharpening and using the tools, a great amount of heat is developed, and little by little the tools lose their hardness.

I have seen many good carpenters, who rejoiced in having a planing-knife a little hard. "It will soften by use," they would say, and with reason, although perhaps not knowing why.

For grinding, the stone should be dipped in water to prevent the heating of the tools; and careful cutlers use oil for polishing, instead of water, when using grindstones of small diameter.

Never follow the example of the street knifegrinder. He does much work, and cheap work. He uses as little water as possible. You give him a good razor or a good knife, and he gives it back to you well sharpened, but a spoiled tool, which needs to be hardened anew.

Therefore, when sharpening your tools, take large stones with much water, and make slow and good work.

MECHANIC.

Place of Piston when Crank is Vertical.

MESSRS. EDITORS.—On page 423, vol. XV. of the SCIENTIFIC AMERICAN, you have given from the pen of P. H. Vander Weyde, M. D., etc., about one-third column of spiteful, uncalled-for and out-of-place observations on my mathematical knowledge (which few of your readers care about) and charge also that my ignorance has led me into an error, when the truth is, that the error is with P. H. V. W. and not with me. I trust you will allow me a little space to defend myself as briefly as possible.

On page 268, P. H. V. W. gave a rule which he says is the *true* rule. "Call the length of *piston rod*, m, and the *crank*, n, then the distance of the piston to the opposite end of the cylinder will be represented by this expression, $m+n-\sqrt{m^2-n^2}$.

He also puts it into words as quoted below, and as he says in the simplest form. "Take the square root of the difference between the squares of length of *piston rod* and crank, and subtract this difference from the sum of these lengths: the result will give the distance of the piston from the extreme end of the cylinder." If there are any grammatical errors in the above rules they are not mine. He adds also, that any persons understanding elementary geometry may easily demonstrate this rule. I (not being of that class in his opinion) feel competent to demonstrate the fallacy of it.

Now take his rule quoted above, and apply it.

Take the stroke or length of *piston rod*..... 4
Length of connecting rod..... 8
Length of crank..... 2

As, according to this rule, the connecting rod does not enter into the calculation, it does not matter what its length is, and the result will be that the distance moved, $= 4+2-\sqrt{16-4}$, $= 2.534$. And so in every imaginable case of varying lengths of connecting rod where the lengths of *piston rod* and *crank* remain the same, his rule must produce the same result, as I said in my former communication. He now puts forth a different rule, which I have nothing to say about, but I think if he would propose the rule above quoted to some of his old scholars, whom he taught in such a straightforward manner, and who, I suppose, never "went back" on their teacher, they might possibly convince him of his error, if he will not believe his own eyes. He speaks of an error in my calculation. If you have my manuscript (of which I have a copy) you will find that 2.265 is an error of the press, as I put it 2.254, and if you or your readers will take the trouble to apply his rule, quoted above from page 268, you will easily see that he is wrong. P. H. V. W., on page 268, signs himself simply M. D. He professes a great deal. It is very common for persons to take pleasure in telling what they once were, but in very many instances it would be better to bury the past: therefore, to show him a good example, I will only subscribe myself,

HENRY W. STEPHENSON, *now* Tinner (or Tinker),
No. 30 W. 5th St, Cincinnati, Dec. 26, 1866.

[The communication to which our correspondent refers, was not in good taste, but we did not feel at liberty to alter its general wording. We permit Mr. Stephenson to reply, and with this the controversy must cease, so far as our columns are concerned. We are flooded with articles on the "position of the piston when the crank is vertical." We cannot publish them all, and will reserve one of the number, from a naval engineer, for future use.—EDS.]

Modern Medicine.

MESSRS. EDITORS:—In a recent issue, you make some sensible remarks on modern medicines. I wish to add a few remarks on the dual action of medicines, which will explain a good deal of what appears to be conflicting in the different systems. It is well known that many medicines have directly opposite effects on the human system, in different doses.

To make this clear, take for illustration the effects of some common remedies, as opium, calomel, tartar emetic, and alcohol in its various forms.

You may produce a stimulant, exhilarating effect with a small dose of opium, and you can produce a contrary or sedative effect with a large dose.

A large dose of calomel causes free discharges from the bowels; a small dose will check diarrhea. A given quantity of tartarized antimony has an emetic effect; a smaller quantity will check vomiting.

A small quantity of alcohol is stimulant; a large amount is stupifying. And this will hold good throughout the *Materia Medica*.

It is evident, then, that you may practice medicine successfully with either set of doses. You may open the bowels with calomel or opium, and you may check diarrhea with either calomel or opium. An Allopathist would use the large dose of calomel to open the bowels; a Homœopathist would use the small dose of opium to produce this effect. The Allopathist would use the large dose of opium to check diarrhea; the Homœopathist, the small dose of calomel.

As usual, there is truth on both sides of the line. A sensible physician will prefer the small doses as a rule, but large ones may be eligible sometimes.

Jahr's Manual is an excellent text-book for the practice of Allopathy, because it shows the full effects of large doses on the human system. As to how much is a dose, I leave the doctors to decide. Respectfully,

W. F. QUINBY, M. D.

WILMINGTON, Del.

[When we wrote the article on modern medicine, page 391, last vol., to which Dr. Quinby refers, we did not propose to open the subject for discussion. The facts, however, stated by him are generally worth knowing: with this we close the subject.—EDS,

Water Spouts--Western North Carolina Mountains.

MESSRS. EDITORS:—I have read with pleasure the interesting letters in your valuable journal from "D. C." (David Christy, Esq., I suppose). An authority, too, upon the subject he treats, and those analogous to it, as good as any in the United States. I know that his observations, especially in the Southern Alleghanies, have been practical and thorough. The phenomenon exhibited at Clayton, Ga., I have witnessed at Hickory Nut Gap, on the road from Asheville to Rutherfordton, and at other points in the mountains of Western North Carolina. One of the most singular and useful effects of fog and air currents is exhibited yearly on Tryon Mountain, in Polk county, near the upper waters of the Saluda River. There frost is never known, and the peach crop never fails. In my investigations in Western North Carolina, I found similar mountain sides in other counties, where, for instance, the leaves are untouched by frost for many days later in the year than those adjoining.

Waterspouts I have frequently heard of and had the *pleasure* of being in a small one. On the French Broad River above the Warm Springs, can even now be seen the traces of one by which a boulder containing at least 1000 cubic feet, was carried from the top of the mountain about 400 yards down

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into the bed of the river. The track of the spout was about thirty feet wide. It occurred many years ago, and one of the old settlers told me it was accompanied by a great wind and noise. In Haywood county there is a singular split in the top of a mountain, said to have occurred about the same time. I visited the track of one on an old road leading from the Warm Springs to Tennessee. Just where the spout crossed, the road had been treated with poles on the corduroy plan. In their place was an immense ditch, while some of the poles were to be found in trees far below. One of the neighbors describing it said, "the spring branch was as big as Broad River." I learned also that they were frequent there, and the road, though the best and shortest to Tennessee, had to be abandoned for that reason. The formation of the gap above was similar to that described by "D. C." at Clayton and on the north-east side (in Tennessee, the State-line, apparently straight on the map, runs with the Unaka Ridge, hence is zigzag) was a farm noted for its peaches and grapes. I tried both myself when none were to be had anywhere else for sixty miles around. I shall not occupy your valuable space with any theories as to the frost-line or fog and air currents. The latter has been well and no doubt will be fully treated by "D. C.," and I know more ably than I should: but there are peculiarities of formation and location in the mountains of Western North Carolina, which especially fit them for the culture of the grape. I know by observation, and it has been demonstrated by others in practical experience. One of these peculiarities is in many points a total absence of frost, or, as some term it, the existence of a line of altitude above which frost has never been known. The seeming mystery is plainly solved in the action of fog and air currents similar to that so well described as existing at Clayton, Ga. In one point I think D. C. is incorrect: the term is not Ball but Bald, from the utter bareness or absence of any tree-growth. The Indians viewed these bald peaks with a religious reverence. My own opinion is that they had an origin in fire, and as the practice of burning the woods is yearly becoming less common, they are decreasing. Another theory is that they are caused by the fierce, cold winds which sweep the elevated and exposed points. Still I have seen points equally high in the immediate neighborhood covered with trees. Some of the Indians call them "Devil's tracks."

The Warm Springs region is one of peculiar interest to scientific men. The water of the Springs has a temperature of 104° Fahrenheit, contains sulphur, carbonic acid gas, and traces of some other minerals. They are located near the junction of the limestone and metamorphic slates. As a mineral region the country has never been well explored; lead, silver, and copper are plenty, iron of the best quality abundant; a large mass of corundum opens a few miles from the Springs, and I was shown a sample of cinnabar which was said to have been obtained from a creek about fifteen miles from the Springs, The scenery is wildly grand and beautiful, and were the river but navigable its fame would be world-wide. A railroad from Greenville, S. C., via Asheville, N. C., to some point on the East Tenn. and Va. R., has for years been chartered, also an extension of the Wst. N. C. R. R. to a similar point. One will be built, surveys have been made and some grading done. The Springs are located on the French Broad River, twenty-four miles from Greenville, Tenn., on the East Tenn. and Va. R. R. H. E. Colton.

Brooklyn, L. I., Dec. 27, 1866.

[For the Scientific American.]

Graphite--Plumbago.

In addition to our communication on this mineral—vide page 388, last vol. Scientific American—we will give some further statements in relation to the same subject.

According to Percy, the value of the graphite does not depend upon its purity, but upon its grain and texture, for the crystallized graphite of Ceylon, in which only from 1·2 to 6 per cent of foreign ingredients exists, is not fit for pencils; while the black lead from Borrowdale, in England, with thirteen per cent of impurities, has been found to be very well suited for their manufacture. For the making of pencils, only a compact, grainy kind is suitable; while for crucibles, the loose mold, with graphite appearing in shiny scales, is preferable. This kind generally occurs with an enormous amount of mineral matter, unequally diffused through the mass, and producing thus, even in small hand-pieces, respective differences in its specific weight.

The most valuable kind of graphite is, of course, that which is applicable for the manufacture of pencils; but it is seldom found. The graphite of Borrowdale, above referred to, is sold monthly by auction, at a place from 35 shillings to 45 shillings a pound. According to Ure, the net produce has in the six weeks annual working of some years amounted to 30,000 or 40,000 lbs. At the last World's Fair in London there were samples exhibited from Liberia, which were said to be still more valuable than the Cumberland graphite. In 1863, a process of preparing black lead was described by Brodie, which is said to produce a material adapted to all those purposes to which, thus far, the best and most expensive plumbago has alone been applicable.

Graphite is extensively used in making crucibles for melting the precious metals and in jewelry manufactories, as well as for melting bronze, steel and iron in small quantities. The crucibles of Passau, Bavaria, are much in demand, but they are now of an inferior quality, compared with ten or twenty years ago, when they could be used for thirty operations, while at present they do not stand more than eight or ten. The material from which those crucibles are made does not properly bear the name of graphite—it is gneiss, containing only 48 to 35 per cent of graphite. First it is reduced to a fine powder, then mixed thoroughly with one half or one third of its weight of clay, formed to a paste and stamped into forms or worked like earthenware. The product is not burned, but only exposed to a moderate heat until perfectly dry.

Until twenty years ago England supplied all its wants in this article by importation from Germany. Now it produces its own, and even competes with Germany, by importing the graphite from Ceylon. In 1862, 2,084 tons of plumbago were shipped from Ceylon, and of these not less than 1,736 tons were brought to England. Most of this quantity is probably used by the Patent Plumbago Crucible Co., at Battersea, near London, who also employ the Stourbridge clay: but as very much depends upon the proportion in which it is mixed with the black lead, this proportion is kept a secret. Still, it has been found by analysis, that their crucibles contain 52.6 per cent of carbon, 45.4 per cent of earthy matter, and 2.08 per cent of water. We may mention further, that in 1862, the price of the Ceylon graphite was £10 sterling per ton, and that at present it is £25.

Besides the uses above mentioned, plumbago is employed for portable chemical furnaces, muffles, retorts and tubes for chemists. Mixed with soft soap and lard oil, it forms a very good lubricator for gearing.

Graphite is generally considered as an allotropic state of carbon. It has also been regarded as a carbide of iron, for the reason that it is mostly found in combination with iron. It has only recently been advanced by a French chemist that graphite must be considered an elementary substance. It has been obtained artificially, by slowly cooling gray cast iron which was overcharged with carbon, and dissolving the mixture in aqua regia; a crystalline body of a metallic lustre, and identical with the natural graphite, remains in the liquid; and lately Paula observed its formation from the cyanogen compounds in the preparation of caustic soda. Lead.

Patent Dredging Machine.

"A patent has been issued to McClintock & Scott, of New Orleans, for a dredging machine, upon recommendation of Gen. Humphreys, Chief of Topographical Engineers, United States Army, that the same is necessary for the prosecution of improvements at the mouth of the Mississippi."

[We find the above in the *N. Y. Times*. There must be some error about it—patents can only be legally granted for new and useful inventions, and not upon the mere recommendation of some party interested.—Eds.]

Artificial Stone.—Sand mixed with a solution of silicate of soda, is reported to make a stone of unequaled hardness. It can be cast into any form and of any tint, while soft; and when laid in cement of the same, may be said to produce an almost imperishable structure of solid rock. A company is manufacturing it in Chicago.

Recent American and Foreign Patents.

Under this heading we shall publish weekly notes of some of the more prominent home and foreign patents.

Log Carriage for Saw Mills. A. M. Beard, Hillsboro Bridge, N. H.—This invention consists in certain new and useful improvements in log carriages, whereby the log is secured and handled in an easy and rapid manner, and also in an index of novel construction, which determines without calculation the point where the saw should enter the log in making the first cut, saving time and labor.

Butter Mold.—H. W. Hopkins, Milford, N. H.—This invention relates to the construction of butter molds of steatite or soap stone.

Burglar Alarm.—George A. Colton, Adrian, Michigan.—This invention relates to an attachment for doors, which attachment is of such a construction and arrangement of parts that, when the door is opened, an alarm will be sounded.

Hanging of Mirrors and Looking Glasses.—W. C. Cumming, Peekskill, N. Y.—This invention consists in so hanging or suspending a mirror that it can be not only lowered or raised in hight, but also brought to any desired inclination at pleasure, and set or sustained in such positions.

Tag or Label Card.—N. H. Bruce. Forge Village, Westford, Mass.—This invention consists in securing the cord or line to the tag, by first nipping and fastening the cord in a hollow metallic tube, that is then secured to the card or tag at one of its ends, by folding such end over the same, and glueing or otherwise cementing or securing the whole together.

Button Hole Cutter.—Charles N. Cutter, Worcester, Mass.—This invention consists in so constructing the cutter that it can be adjusted with the ut most accuracy and readiness to the cutting of button holes of different sizes

Grinding Mill.—Charles Clifton, Jersey City, N. J.—This invention relates to machines for the grinding or pulverizing of paints, ores, and other minerals; and it consists principally of a revolving hollow cylinder tapering from end to end, in combination with a stationary crusher or grinder, the two being arranged and combined together in such a manner that an efficient grinding mill is obtained.

Steam Boiler.—W. D. Andrews, New York City.—This invention consists of a boiler having a fireplace extending over its entire horizontal area, with the exception of a narrow water space surrounding it, and a series of tubes, whether one or more, passing horizontally through the water space, above the fire place, where the said fire place and the said tube or tubes are connected by, and communicated through, a combustion chamber formed outside the boiler, having openings, adjustable or otherwise, for the admission of atmospheric air thereto, and an opening or openings passing through the water space surrounding the fire place, and communicating with the latter.

Sheep-skin or Other Mittens.—A. P. Smith, Sterling, Ill.—This invention consists in cutting the sheep-skin of which the mitten is to be made, in sections, and then sewing up the facing with the mitten, as its several sections are sewed together.

Alarm Gun.—Albert Johnson and S. E. Allen, Raleigh, N. C.—This invention relates to an alarm gun with which persons may be warned of the approach of burglars or thieves—the gun being susceptible of being so set or adjusted as to fire in any direction.

Wagon Jack.—Geo. F. Graves, Mt. Upton, N. Y.—This invention consists in the combination with each other of a lifting lever having a bifurcated end, a toothed locking bar, and a standard, whereby a simple and efficient jack for raising the axles of carriages while lubricating or removing the wheels, is obtained.

Wringer for Clothes, Mops, etc.—Charles E. Gage, Fond du Lac, Wis.—This invention relates to a novel constructed wringer, especially designed for wringing out a mop, although it can be used for wringing clothes to much advantage.

Chemical Preparation for Preserving Butter and Meats.—Wm. Ross, Day's store, Pa.—This invention consists in a chemical preparation intended for the preservation of butter, to prevent its becoming strong and rancid; of fresh meats, to prevent putrefaction, and to prevent the same from receiving a salty and strong taste when preserved by salt only.

Clamp.—Wm. Strevell, Jersey City, N. J.—This invention relates to a clamp especially intended for use in connection with machines for the stretching of leather, in the manufacture of machine belting or banding, although it can be applied for other and various purposes.

Boots and Shoes.—M. Evans, Russiaville, Ind.—This invention relates to the manner of lacing boots or shoes, and it consists principally in so forming the boot or shoe that it can be laced or buttoned up in front in lieu of behind, with the utmost ease and convenience to the person wearing the boot or shoe and with one third less lacing at most.

Harvester.—V. W. Blanchard, Bridport, Vermont.—This invention relates to a new and improved arrangement of gearing for varying the speed of the sickle as circumstances may require. It also relates to a new and useful improvement in applying the driver's seat to the machine, and in the application of springs to the machine as hereinafter fully shown and described, whereby the draught and movement of the working parts are rendered more uniform than hitherto. The invention also relates to an improved manner of attaching the cutter bar to the machine, and also an improved manner of attaching the platform to the machine, whereby the former may be readily detached when necessary; and, lastly, the invention consists in an improved grain-discharging device.

Spindle Stop.—Francis A. Sterry, Canton, Mass.—The object of this invention is to provide a simple and effectual method by which the stops of upright spindles and shafts may be frequently and sufficiently oiled automatically, and the invention consists in a peculiar-formed cup attached to the ordinary stop box.

Weeding or Hand Hoe.—C. A. Rose, Columbus, Ga.—This invention has for its object to furnish an improved hoe, the blade of which is removable from the eye, and is so formed that when one side or edge becomes worn it may be removed and reversed so that one blade may last as long as two ordinary hoes.

Ladder.—F. W. Hovey, Boston, Mass.—This invention has for its object to furnish an improved ladder for use in situations where the inclination of the ladder may be varying constantly or may be varied occasionally.

Bob Sleigh.—William M. C. Matthews, Summer Hill, Pa.—This invention consists in pivoting the bolsters to the bobs of the sleighs, for the purpose of preventing the said bolsters from moving backward and forward, when the ends of the bobs go up and down.

Toy Wind Wheel.—Max Miller, Brooklyn, N. Y.—This invention has for its object to furnish a simple, cheap, and amusing toy for children.

Mop Wringer.—A. J. Robinson, Troy, N. Y.—This invention has for its object to furnish an improved means by which a mop may be wrung without its being necessary to take hold of it with the hands for that purpose.

Broom Head.—Thomas B. Carroll, Noblesville, Ind.—This invention has for its object to furnish an improved broom head so constructed and arranged that it may be light, strong, and easily made, and which cannot mar or injure the furniture by coming in contact with it in sweeping.

Scaffold.—D. D. Adams, Brookline, Mass.—This invention has for its object to furnish an improved scaffold for use in repairing the tops of chimneys, simple in construction, easily raised, lowered, or adjusted upon a chimney and which can be closely packed for storage or transportation.

Iron Post for Wire Fence.—B. S. Haviland, Fort Dodge, Iowa.—This invention has for its object to furnish an improved iron post for wire fence, simple, cheap, light and durable.

Grain Dryer.—Archibald H. C. Barber, Clinton, Ill.—This invention has for its object to furnish an improved grain dryer by means of which grain may be thoroughly, evenly and quickly dried.

Fruit Box.—Eli Secor, Lawrence, Mich.—This invention consists in forming a box for the transportation and safe keeping of small varieties of fruits, as berries, etc., by combining a number of trays together in such a manner that they are easily separated, and in which the fruit may be safely kept and transported from place to place.

Automatic Grist Alarm.—Michael W. Helton and James H. Redfield, Bloomington, Ind.—The object of this invention is to provide means by which the miller in custom grist mills may be notified at what time the bags should be changed from one grist to another, so that each customer may get the flour or meal from his own grain.

Sad Stone.—H. W. Hopkins, Milford, N. H.—This invention consists in adapting a steatite sad stone to different kinds of work, as ironing and polishing linen and other articles by affixing to it a reversible handle.

Saw Mill Carriage Roller.—William Herrick, Northampton, Mass.—This invention consists in forming the journals of saw-mill carriage rollers of such a shape that the roller and the journals can be cast in one piece, and all lateral motion in the roller and in the carriage which rests upon it be prevented.

Log Adjuster.—Samuel Bristow, Bedford, Ind.—This invention consists in arranging shafts with drum and wheels on them, in such a manner that with a lever, pulley, rope and chains one man may be able to handle saw logs with ease.

Materials for Roofing, Siding and Covering Buildings, etc.—C. J. Fay, Hammonton, N. J.—This invention relates to the use of paper, made of manilla, hemp or grass, for the roofing and siding of buildings, and as a covering or roofing for the tops and sides of cars, decks of vessels and carriages, either upon the inside or outside of the same or both, and for the purpose of awnings or shades or for any other purpose where it is desired to render the surface on which the said paper is used waterproof, or, in other words, impervious to moisture or the air.

Sash Fastening.—Robert Hutton, Brooklyn, N. Y.—This invention relates to a new and improved fastening for window sashes, whereby the latter may be supported at any desired height. It consists of a wedge or key fitted in a socket attached to the window frame and interposed between one of the side pieces of the sash and a friction roller in the socket, whereby a very simple and efficient sash fastening is obtained, one which will afford an easy manipulation of the sash, not liable to become deranged by use, and which may be manufactured at a small cost.

Composition for Coating and Lining Oil Barrels and Similar Vessels.—John P. Schenck, Jr., Matteawan, N. Y.—The object of this invention is to furnish a cheap, effective and reliable means for lining oil barrels and for similar uses, so as to prevent leakage or evaporation; and which shall, at the same time, be so elastic as not to be cracked or injured by the spring of the staves in handling the barrels.

Carpet Sweeper.—George Purrington, New York City, and James H. Purrington, Mattapoisett, Mass.—This invention has for its object to so improve the carpet sweepers as to make them more durable, and more reliable in operation.

Rectifier.—A. Werne, New York City.—The object of this invention is to so arrange a rectifier or doubler, through which the vapors are conducted on their passage from the still to the worm, that the low wines may be quickly and completely separated and retained. This device is very simple, small, and compact, and seems to work to great satisfaction; it can be arranged with little expense on old stills as well as new ones.

Target for Air Guns.—Charles A. Demling, New York City.—The object of this invention is to construct a target for practising with air guns, in such a manner that such portions of the same as may be struck by the ball will fall back so as to be out of reach of the shooter; but when all the parts have been thus thrown back, they may at once be brought forward again by only pulling a rope at the foot of the target.

Churn.—R. W. Shriner, Woodland, Mich.—This invention relates to an improvement in the power by which a churn is worked, and has for its object the giving to the dasher an up and down motion, as well as an alternate horizontal rotary motion; and the invention consists not only in the peculiarity of this motion, by which the butter is much easier made than by any other known motion, but also in the construction of the machinery by which the above mentioned object can be attained.

Compound for Sweetening, Coloring and Flavoring Tobacco.—

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Frank W. Sterry, Morrisania, N. Y.—This invention relates to a nove compound, whereby fine cut or any other chewing tobacco is sweetened and colored without any dangerous ingredients.

SCAFFOLD BRACKET.—Charles Eddy, Grass Lake, Mich.—This invention consists in providing a bracket designed for scaffolds in shingling or roofing buildings.

REVOLVING HAY ELEVATOR.—Matthew Mitchell, Crown Point, Ind.—This invention consists in the construction of a derrick in such a form as to admit its standing near a haystack, and a revolving upright shaft and levers arranged in such a manner that hay can be elevated easily and expeditiously.

DEVICE FOR HOLDING THE SLATS OF WINDOW BLINDS.—Charles B. Francis, Newark, N. J.—This invention consists in the employment of a slotted bar or lever that has a turn at right angles, and around which a metallic strap passes and is secured to a window blind, in such a manner that the slats of the blind may be held in any desired position.

REAMER.—William Burlingame, Exeter, N. H.—This invention consists in uniting and casting steel cutters with the body of a reamer, so that a large quantity of steel may be saved; also large size taps may be cast in with the threads of steel upon the outside.

FASTENING SLEIGH BELLS.—J. H. Abell, East Hampton, Conn.—This invention consists in the arrangement of a T-shaped, double hook spring catch, in combination with a sleigh bell, provided with a slot or mortise to receive the hook-shaped ends of the spring catch, in such a manner that by passing the hooks of the catch through the strap or other material to which the bell is to be fastened, and forcing them into the slot of the bell, they spring apart over the inner edges of said slot, and the bell is firmly held in its place.

SAFETY ATTACHMENT TO CARRIAGES.—Claude Ducrux, New York City.—This invention relates to a new device, whereby a wagon can be instantaneously stopped and the horse detached therefrom in case the latter should try to run away.

COTTON SCRAPER.—Nicholas Gotten, Union Depot, Tenn.—This invention consists in constructing a cotton scraper in such a manner that the scraper may be adjusted to different angles and depths upon the frame as the nature of the work may require.

MANUFACTURE AND TINNING OF LEAD PIPES.—Frederick Bennett, Watford, England.—This invention applies to lead pipes manufactured by hydraulic pressure, and it consists of not only an improved process of manufacturing lead and composition pipes, but likewise of a new mode of tinning, silver tinning, or coating lead pipes with other non-corrosive metal or composition.

JOINT FOR PIPES.—James Bowden, New York City.—This invention relates to a joint for lead pipes or pipes of any other description, which is composed of two tapering or wedge-shaped thimbles, which are split or made in sections, in combination with a clamping nut screwed on the end of the inner thimble, in such a manner that when the thimbles are properly arranged on the end of a tube and the nut is screwed up, the inner thimble is firmly clamped to the pipe, and a union coupling, or a coupling of any other description, can be readily secured to the end of said inner thimble, and two pieces of lead pipe can be united without soldering or "wiping."

PROCESS FOR GLAZING PAPER.—Frederick Beck, New York City.—This invention consists in treating paper with stearic acid by applying the acid to it and then exposing it to the action of friction surfaces, in such a manner that the surface of the paper is coated with a thin layer of said acid, imparting to it a fine gloss, and rendering it soft, white, and impervious to water.

PAPER FILE.—Joseph Fleischl, New York City.—This invention relates to a paper file which can be used for one single paper or for a number of papers. For the purpose of securing a single paper a segmental cylinder is slipped over the side bar of the paper file and over the paper, so as to hold the paper without injuring it in the least. If two or more papers are to be filed in the paper file, adjustable spring clamps are secured to the side bar of the paper file, and the papers to be filed are held between the springs and the flattened surface of said bar.

WINDOW LATCH.—Ernst T. Hofmann, Poughkeepsie, N. Y.—This invention consists in the arrangement of a spring stop or catch in combination with an ordinary revolving latch, in such a manner that when the said latch is closed, it is securely locked by the spring stop, and it cannot be opened or forced back until said stop or catch is depressed or made to release the latch.

LOCK.—Rudolph Vollschwitz, New York City.—This invention relates to a lock, the mechanism of which is inclosed in a cylindrical case, said mechanism being composed of three (more or less) tumblers, which are provided with slots to admit the key, so that by turning said key the heads of the tumblers arrange themselves in the proper position to allow the tumbler to move in or out. An elastic pad or spring which bears on the ends of said tumblers, has a tendency to keep the same in such a position that their slots coincide to admit the key, and that their heads prevent the bolt from moving, the whole mechanism being so arranged that it takes but little room, and that a safe lock, with a small and convenient key, can be produced at a comparatively small cost.

MACHINE FOR PRESSING PEAT.—N. H. Barber, New York City.—This invention relates to a peat machine composed of a revolving annular cylinder, provided with a number of holes and with a series of plungers which revolve with the cylinder, and move back and forth in the holes by the action of cams, which draw them out to receive the feed and force them in at the proper time for the purpose of compressing the peat while the cylinder is in motion.

MANUFACTURE OF STEEL-HEADED RAILS.—L. M. Hart, Troy, N. Y.—This invention consists, first, in uniting the steel slab with the slab of iron by welding or other means, previous to the operation of rolling, in such a manner that the steel is prevented from scaling off when the rail is ready. It consists, second, in securing the steel slab to the pile by screws or hook bolts, or other means, in such a manner that the steel is prevented from curling during the operation of rolling, and steel-headed rails can be produced which are durable, and from which the steel is not liable to separate itself.

REFINING OIL, ETC.—Max H. Kruger, New York City.—This invention relates to an apparatus which is intended for deodorizing and refining petroleum and other hydrocarbon liquids. It consists of a series of filters which are filled with powdered charcoal or other suitable material, and hung on rods in the interior of a chamber or box which can be filled with steam, in such a manner that the petroleum or other hydrocarbon liquid, while passing through the filtering material, are kept at a sufficiently high temperature to prevent the resinous parts in said oil from choking up the filters, and the operation of filtering can be conducted with ease and facility.

MANUFACTURE OF WOOL FROM PINE LEAVES.—Adolphe Rogue, Brire, France.—This invention relates to a new mode of producing from pine leaves a sort of hygienic wool, capable of replacing to some extent common wool or hair in their various applications, and particularly fit to be employed in certain diseases such as rheumatism, gout, pulmonic affections, neuralgia, and so forth.

CENTERING TOOL.—Nathan Puckett, Terre Haute, Ind.—This invention relates to a novel and convenient device for drilling a center hole accurately in a bar of iron or any piece of timber to be turned in a turning lathe.

RAILROAD FREIGHT CARS.—Richard Eaton, Montreal, Canada.—This improvement relates to the construction of railroad freight cars, and is designed for increasing largely the capacity of a car for carrying freight.

RAILROAD CAR BRAKES.—Charles Bemis, Mishawaka, Md.—This invention relates to a new and improved arrangement of a brake apparatus for railroad cars.

SPRING CRUPPER.—Edward Powell, Spring, Penn.—This improved crupper is provided with a spring supporter which exerts a constant upward pressure under the tail of the horse so as to induce a habit of carrying the tail in a higher and more graceful position.

SAWS.—Asa Bee, White Oak, West Va. (patented January 1st, 1867).—This invention relates to the application of plane-irons or bits to the ordinary mill-saw, for the purpose of removing the roughness or projecting fibre from the face of the plank as the saw passes through the kerf; and the improvement consists in grooving the cutting edge of the plane-iron, the better to adapt it to discharge the cuttings which it removes from the wood.

SPRING HOLDER FOR WIPING CLOTHS.—Patented January 1st, 1867.—Henry Johnson, Chicago, Ill.—This invention consists of an arrangement of spring fingers, adapted to be furnished with a wet or dry cloth, to be used in cleaning exterior or interior surfaces, dishes, bottles, lamp-chimneys, and other hollow articles, especially those difficult to be reached by the hand and of varying interior diameter.

CULTIVATOR.—J. C. Hoffeditz, Mercersburg, Penn.—The invention consists of a cultivator or marker, having adjustable spring standards and handle, and with shovels, adapted to different kinds of work, or removable for the purpose of adapting the machine to a different class of work. "Rights for all the States except Pennsylvania for sale."

CULTIVATOR TOOTH.—J. C. Hoffeditz, Mercersburg, Penn.—The standard is pivoted in the hanger by a bolt, and is restrained from vibration by a wooden pin, which breaks when the share comes in collision with an immovable obstacle, the standard being replaced in position, after passing the obstacle, and a new pin inserted. "Rights for all the States except Pennsylvania for sale."

BURGLAR ALARM-GUN.—Peter Sinsher, Versailles, Ohio.—This invention relates to an improved compound gun, having several barrels so connected and arranged as to be fired simultaneously in different directions, as a defence against burglars.

SELF-LUBRICATING ATTACHMENT FOR JOURNALS OF MACHINERY.—George M. Morris, Cohoes, N. Y.—This invention relates to an improvement in self-lubricating or oiling apparatus for journals of machinery, and consists in attaching an oil-cup to the journal-box in such manner that any excess of oil flows back into the oil-cup from the journal-box. Thus the journal is kept constantly lubricated; heating is prevented and there is no waste of oil.

COTTON-CLEANING AND RELINTING MACHINE.—Robert J. Clay, New York City.—This invention relates to a machine for cleaning and relinting cotton wool which has been damaged by matting the fibres together and becoming foul with dirt or any extraneous substance.

TRUSS FOR HERNIA.—John A. W. Justi, Savannah, Ga.—This invention consists in the peculiar conformation of the pad-plate, which is not a simple flat spring, but is curved and arched in such manner that the pads may be fitted accurately against the person of the patient, securing ease and comfort in the movements of the body.

FIRE-GRATE FOR STEAM BOILER.—Richard Eaton, Lee, England.—This invention relates to an improved mode of constructing fire-grates and furnaces for locomotive and other steam boilers, to burn wood or peat, and consists in the arrangement of grate-bars, which overlap and underlap each other in steps or terraces, with horizontal divisions between the bars, directing the air laterally towards the sides of the fire-box.

STREET CAR HEATER.—John Gibson, Albany, N. Y.—The object of this invention is to warm street cars: it is accomplished by placing one or more stoves under the seat, and conducting the smoke under the flooring and up to the roof, where it escapes without giving any annoyance, after radiating its heat into the car in its passage through the pipe.

VALVES.—Samuel J. Peet, New York City.—This invention relates to an improvement in valves for steam, gas, air, water, and all other fluids, where valves, cocks, faucets, gates or traps are used, and consists in a pair of metal discs or plates fitted in a box or shell, in such a manner as to close against the seats by being spread apart with a conical wedge, or a straight wedge turning on a swivel screwed between the discs, or which may be operated on by a sliding wedge.

STREET RAILROAD CARS.—Joseph S. Fairfax, Wheeling, W. Va.—This invention relates to improvements in a street railroad car, the principal object of which is to enable the car to turn curves easily, so that it may be stopped on the curve if desired, and be started again without difficulty.

SPOKE-DRIVING BENCH.—F. M. Lemmon, Shelbyville, Ill.—This invention relates to a new and improved machine for driving spokes in wagon-wheel hubs, and consists in a bench having a hub-clamping device by which the hub is firmly secured to the bench, and an adjustable rest for holding the spokes as they are driven, and also a binding device for holding the spokes down snug in the said rest, the whole making a very simple and desirable machine for the purpose mentioned.

CANE STRIPPER.—Melcher McClinger, Dayton, Ohio.—This invention consists in the employment of two or more spring cutters which with a stationary plate form the device for cutting off the heads of the canes and with the further addition of a self-adjusting plate or plates form the stripping device.

REST FOR TURNING LATHES.—Henry K. Smith, Norwich, Conn.—This invention consists principally in a novel arrangement of gearing whereby the movement of the rest can be changed in direction at pleasure, that is, made to move either toward the right or left on the lathe bed and also in a novel manner of constructing the rest whereby it can be raised and lowered according as may be desired.

MACHINE FOR CUTTING FILES.—Isaac Goodspeed, Norwich, Conn.—This invention relates to a new and improved machine for cutting files, and has for its object simplicity of construction and the obtaining of all the advantages attending more expensive and pretentious machines hitherto devised for the purpose.

CAR COUPLING.—James McLaughlin, Duncannon, Pa.—This invention relates to a new and improved car coupling of that class which are self connecting or self-coupling, and it consists in a novel construction and arrangement of parts, whereby a very simple and efficient car coupling of the class specified is obtained.

COMBINATION OF A SQUARE, LEVEL, BEVEL AND PLUMB.—G. L. Chamberlin, Marietta, Ohio.—This invention relates to a new and useful combination of a square, level, bevel and plumb, whereby the several tools above specified are combined in one and either rendered capable of being used by a very simple adjustment of a part partaining to the device.

SHUTTER AND BLIND FASTENING.—Robert Hutton, Brooklyn, N. Y.—This invention consists of a fastening constructed and applied to a window shutter or blind, in such a manner as to admit of the shutter or blind being secured in a more or less open state as desired, and also admit of being readily manipulated to secure the shutter or blind in any position between a fully open and nearly a closed state.

BLACKING BOX HOLDER.—George W. Taylor, Springfield, Vt.—This invention relates to a new and improved device for holding blacking boxes, so that the hands of a person in blacking boots or shoes will not be soiled in rubbing the brush over the moistened blacking in the box. The device also admitting of the box being suspended on a nail or hook convenient for use at any time.

MACHINE FOR MAKING EYELETS.—Levi Richards, Providence, R. I.—This invention relates to a new and improved machine for making metallic eyelets, and it consists of a cutter and dies arranged and operated in such a manner that they will cut the plate in circular form and swage it into cup or tube shape. The invention also consists of a conveyer or carrier for taking the cup or tube from the dies above mentioned, and conveying it to a second pair of dies operating in connection with a punch, and in such manner that the cup or tube, formed by the first pair of dies, will be swaged into proper form and punched, so as to complete the eyelet.

CULTIVATOR.—A. P. Hammon, J. H. Lincoln, S. Lincoln, T. W. Hammon, Montfort, Wis.—This invention relates to a new and improved device for cultivating plants grown in hills or drills, and it relates to a new and improved manner of arranging the plows, whereby the same are made to penetrate the earth at a uniform depth whether the device is passing over horizontal or inclined ground, and it also consists in a novel means for guiding the machine whereby the plows may, with the greatest facility be made to conform to the sinuosities of the rows of plants.

LOCK.—E. L. Gaylord, Litchfield, Conn.—This invention more especially applies to drawer locks and small locks generally which are placed upon parts adjacent to each other, such, for instance, as the drawers of a bureau, the small doors of a secretary, etc., and which should be provided with different keys so that one key cannot unlock more than one lock.

HOISTING TACKLE.—J. C. Pierce, New Philadelphia, Ohio.—This invention relates to a new and improved tackle for hoisting articles, generally such, for instance, as hay from wagons into the bays of barns, goods in warehouses, etc. Its object is to obtain a device for the purpose specified, which will admit of the articles being hoisted and also conveyed, when in an elevated state, to the place where it is to be deposited.

GRINDING MILL.—Gilbert D. Jones, New York City.—This invention relates to a new and improved grinding mill, of the kind commonly termed the Chilian mill, and it consists in having the peripheries of the wheels or rollers of V-form, and the bed on which the wheels or rollers work provided with an annular V-groove for the peripheries of the wheels or rollers to work or run in. The invention also consists in the employment or use of scrapers applied to the machine in such a manner that by a very simple adjustment the material to be ground may be kept within the path of the wheels or rollers, and when sufficiently ground discharged from the bed plate.

HOLLOW AUGER.—Joseph Ward, New York City.—This invention relates to a new and improved hollow auger, for cutting tenons on the ends of spokes, and also on the ends of tool handles to receive the ferules, the holes in the handles to receive the tangs of the tools being bored at the same time. The object of the invention is to obtain an implement for the purpose specified, which will be capable of being adapted to cut tenons of different diameters as may be required.

Answers to Correspondents.

CORRESPONDENTS who expect to receive answers to their letters, must, in all cases, sign their names. We have a right to know those who seek information from us: besides, as sometimes happens, we may prefer to address the correspondent by mail.

SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisements at 50 cents a line, under the head of "Business and Personal."

C. L. K., of Ill., asks:—Will there be any loss of water from a steam boiler with 75 lbs. pressure, supplying by means of a coil, steam for heating cold water or syrup, if the discharge of the coil is turned back to the boiler: and will the flow be kept up? We reply: If the coil is placed at a higher elevation than the boiler, the condensed water will be forced back to the water space of the boiler by the steam pressure, but not otherwise, as gravitation as well as the friction of the pipe must be overcome.

E. R. B., of N. Y., inquires why, when repeated hardenings of steel have cracked the metal, heating it to a low red and plunging in water will toughen it. Ede accounts for it by stating that repeated heating of steel abstracts the carbon and tends to return the steel to the condition of wrought iron.

A. P. H. D., of Wis.—There is no instrument corresponding in attractive power to a magnet, which has any value in discovering the precious metals. The "divining rod" is a relic of superstition and ignorance.

W. L. G., of N. Y., A. E., of Wis., and R. J. S. of O., suggest that W. F. D., of Conn. (page 406, Vol. XV.) has not taken care to remove the air from the upper angles or bends of his conduit pipes. Bubbles of air so confined have been the source of much annoyance. They are pretty sure to be found when the water is first let into an undulating pipe. The best way to remove them, is to close the delivery end of the pipe, and make small holes at the tops of the angles: as soon as the water flows out of the holes they are plugged up. If any of the angles are higher than the source, a suction pump must be used for them. When the water is highly aerated, as is often the case with spring water, the upper bends of the pipe should be provided with air chambers, each having a stopcock. This subject has been before discussed in this paper, and we took it for granted in our reply to W. F. D., that he was well informed on it.

H. W. H. of——.—Any person may call an article patented, or unpatented, in an advertisement. The law imposes a specific penalty only, when an article is stamped patented upon which no patent exists. If any person were to suffer by the deceptive advertisement he would have a remedy by writ at common law.

F. N. B., of Wis.—The bubble of air is to be removed from your barometer by inverting the tube and then dexterously moving it till the bubble escapes. But preliminary to this manipulation you must completely fill the well with distilled mercury and cork it up that the mercury may not be spilled. But if the instrument is valuable you will do better to send it to the manufacturer.

F. S., of O.—The mineral you send is iron pyrites or sulphide of iron. It is sometimes called fool's gold, and in small quantities it is worthless.

W. L. O., of Pa.—We know of no treatise on the gaging of casks. There is the gaging rod to be obtained at any tool store, which can be procured with directions for use. The contents of a cask can be approximately ascertained by measuring the various dimensions of the vessel and then performing a simple arithmetical calculation explained in almost any mechanical handbook.

J. Q. E., of Mass., asks how the wheels of a car rigidly secured to a common axle can turn a curve the inner rail of which is twenty feet shorter than the outer, without slipping. We answer, we do not know. We never supposed anybody thought they did. It is evident that either the outer wheel must drag or the inner one slip.

C. Oswego, N. Y.—Common gum copal varnish will preserve gun barrels from rust. A little boiled linseed oil may be mixed with it, and then it can be removed by turpentine.

Business and Personal.

The charge for insertion under this head is 50 cents a line.

Felix W. Robertson, of Galveston, Texas, wants to know where he can obtain a quick-setting and durable cement for cisterns. He builds cisterns of shells, sand, and Rosendale cement, which in the place where he operates will not harden except after an "inconvenient period."

I. T. J., 31 S. 3d street, Reading, Pa., wants descriptive circulars of spinning gins, hand looms, etc., for farm use. Also powder-drying machine, machine for making cigarettes, and most approved wind mills.

H. L. See back numbers of SCIENTIFIC AMERICAN as to steam plows.

E. H. Bell, Antestown, Pa., desires to know where he can obtain philosophical callipers.

The address of Mr. Rogers, the patentee of the "Naphtha Lamp," is wanted by Geo. H. Baker, Morenci, Mich.

B. and C., Canada, desire to know where they can obtain machinery for making solid-head pins. Also who owns the patent for tinning wire for pins.

Geo. P. Peck, Evansville, Ind., wishes to communicate with the agents or owners of Rodgers's Patent Gas Lamp, or Burner.

"Where can I get a Patent Chimney Jack," asks E. T. Barnum, Topeka, Kansas.

J. R. Lente, Blooming Grove, N. Y., desires to communicate with parties who drill wells through sandstone.

Makers of Wells's Patent Circular Saws are requested to communicate with J. A. Demuth, Forest City, Mo.

Inventions Patented in England by Americans.

[Condensed from the "Journal of the Commissioners of Patents."]

PROVISIONAL PROTECTION FOR SIX MONTHS.

3,007.—FLOOR COVERING.—James H. Spencer, Philadelphia, Pa. Nov. 16, 1866

3,009.—MANUFACTURE OF LADIES' SKIRTS.—Morris Opper, New York City. Nov. 16, 1866.

3,134.—MODE OF AND MEANS FOR REGULATING AND REGISTERING THE TENSION OF PIANOFORTE STRINGS.—Levi L. Tower, Boston, Mass. Nov. 28, 1866.

3,237.—MACHINE FOR PEGGING BOOTS AND SHOES.—Reuben W. Drew, Lowell, Mass. Dec. 8, 1866.

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Improved Grinding Mill and Brick Press.

The advantages claimed for the machine herewith represented, are that it is equally well adapted for both common and pressed bricks, can be worked by hand, steam, or horse power, tempers and grinds the clay perfectly, and works with great rapidity.

Fig. 1, shows a perspective view, and Fig. 2 a view of the under side exhibiting the working parts of the press. The mill can be built either of wood or iron, or a combination of the two. Standing vertically in the center is a shaft armed with knives projecting radially from it in regular horizontal planes from the top to near the bottom. The bottom row consists of much broader knives, which act as scrapers. All these knives have their cutting edges turned upward at an angle of about thirty degrees, gradually forcing the clay downward while finely cutting and mixing it.

Fig. 1

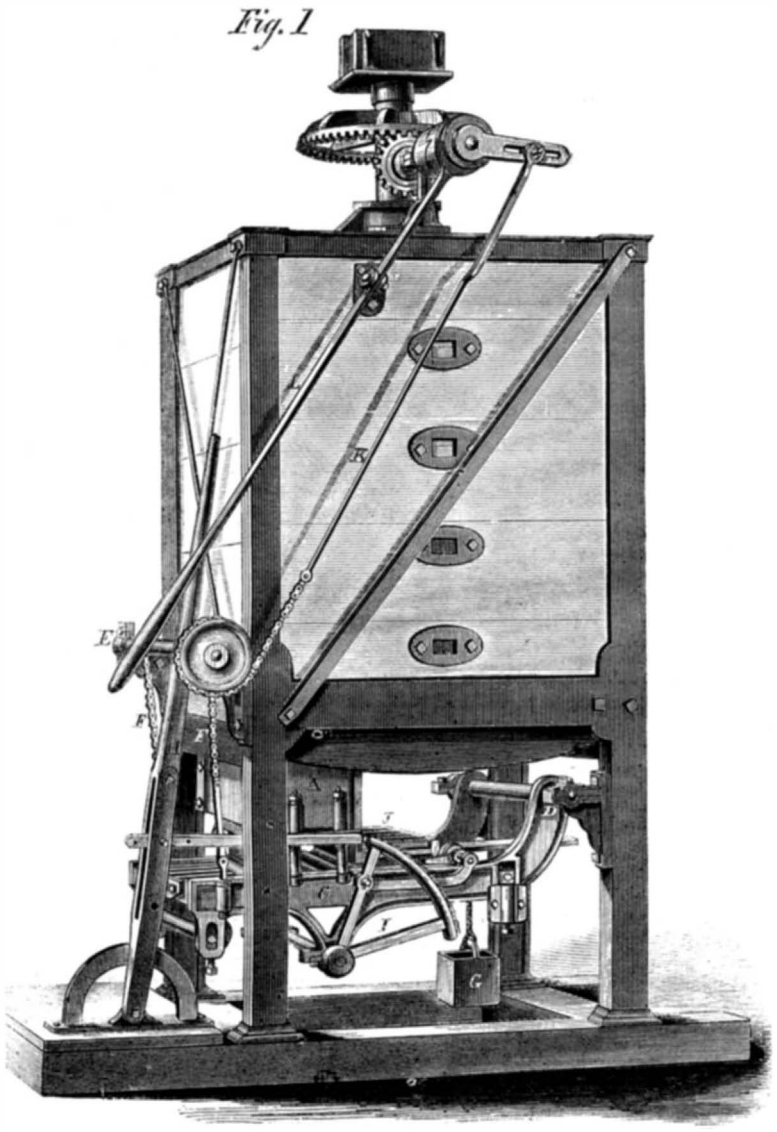
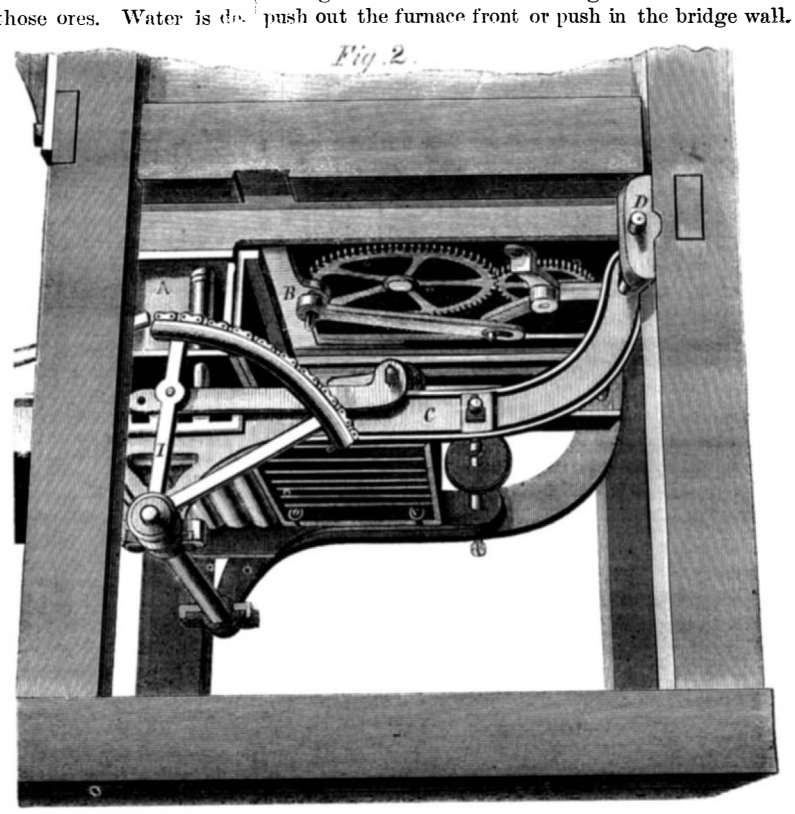


Fig. 2



LAFLER'S GRINDING MILL AND BRICK PRESS.

The press box, A, is secured rigidly to the under side of the frame. It is a box of metal, having enclosed sides and ends and open at the top and bottom, the aperture at the top communicating with the interior of the mill. A slide partly seen at B, Fig. 2, when the press box is filled, advances across the top of the box on slides, and closes communication between the box and the mill. Fitting into the press-box is a clod-crusher or plunger, open at top and bottom, and divided by partitions to form the bricks. This plunger is secured to the frame, C, which is pivoted at D, and has a vertical motion by means of the shaft, E, and chains, F, in combination with the weight, G, (shown in Fig. 1). The upright lever, H, in the front of the machine, same figure, operates the segment, I, which advances the follower, J, and pushes the filled molds to the front of the frame.

The operation is as follows: A bottom board, with pallets for each brick, is placed upon rollers in the frame, C, the press box being filled with clay, when the slide, B, moves forward and makes a base for the follower or plunger, which is forced up into the box, pressing the clay into five separate bricks. The frame, C, is then lowered, and the slide, B, receded, the bricks by the downward action of the plunger are deposited upon the pallet boards and pushed forward by the follower, J. They may then be removed and set on edge in hakes or on shelving for drying. For nice pressed bricks, a hand-wheel with radial levers may be placed upon the shaft, E, for raising the frame, C, and any amount of pressure required be exerted. For ordinary bricks the machine works automatically, the frame being raised by the rod and chain, K, attached to the lifting shaft, E. This chain and shaft are worked by the bevel gears at the top of the mill, the connection being made by a clutch and lever, L, the action of the slide, B, being controlled and regulated by the gears and levers at the bottom of the mill, seen in Fig. 2.

The plunger is sustained in position by rubber springs surrounding bolts at each end of the box, A. This secures against the breaking of this portion of the machine if any foreign substances should by accident get into the clay. The hight of the frame, C, can be regulated by a shaft under its front end, having an eccentric cam secured to each end of it.

The change from the conditions required for pressed brick to those for common brick can be made in a few minutes. The machine is highly recommended by those who have used it, and on trial has made 6,300 bricks in one hour, and is said to work ordinarily at the rate of from 35,000 to 40,000 bricks per day of ten hours. It is claimed that the pressed bricks made by it are superior to those made in the usual way. The action of the plunger leaves no vacuum in the press box, the clay filling the box instantly, as soon as the plunger is withdrawn. It was patented by J. A. Lafler, Jan. 6, 1863. For information relative to rights to use, or for territory, address the patentee at Albion, Orleans Co., N. Y.

Magnesium.

The usefulness of magnesium as a re-agent, is of peculiar importance. Iron, zinc and cobalt are precipitated from their oxides in a highly magnetic and brilliant condition, by immersing magnesium in an acidulated solution of those ores. Water is decomposed and pure hydrogen is evolved with great rapidity, in consequence of the eager affinity of this metal for oxygen, by simply dissolving in the liqnid in which it is immersed, a little sea salt, sal ammoniac, or acid of any kind. Gold, silver, platinum, bismuth, tin, mercury, copper, lead, cadmium, thalium, and other metals, are also precipitated by magnesium, which is therefore valuable for the detection of mineral poisons: but the metallic bases of arsenic and antimony are not precipitated from their acid solution, because they combine instantly with the hydrogen evolved. As an element of the galvanic battery, and an illuminating agent, these properties of magnesium render it highly effective. A grain and a half of magnesium, with a similar plate of copper, immersed in acidulated water in a glass tube, is sufficient to keep a small electro-magnetic apparatus in motion for nearly ten minutes, and to produce an illuminating jet about four inches in length.

Small Inventions.

In a recent trial in England, Mr. Nasmyth made the following observations on the influence of a small modification on the success of greater inventions. He remarked that "One of the most successful inventions of the day is that, in sugar refining, of the application of the apparatus which used to be applied for drying cloth and getting rid of water from textile fabrics. It was a patent of Mr. Bessemer's for getting rid of the molasses from sugar, by the rapid whirling of this vessel. It was found that the outside of the vessel being covered with wire cloth so as to allow the molasses to escape and yet retain the sugar, the molasses gathered on the outside of the wire cloth and collected there in a coating. After some of the most ingenious minds had been applied to it, and one of the most ingenious men of the day, Mr. Bessemer, the whole thing failed on account of the simple difficulty that remained, a difficulty which stood for some years. But another inventive man suggested that by blowing a small stream of steam on on the outside of the wire cloth, it would just so much dilute the treacle as to allow the treacle to be operated upon by centrifugal action. That small jet of steam made the invention entirely successful. It was one of those trifling little things that it surprises one it should not have been thought of, but it sometimes requires the most profound philosophers to do these things. It was thus with Watt's separate condenser."

A Workingmen's Supply Association.

In No. 20 of Vol. XIV. of the Scientific American we described the plan of a supply store established by the employees of the Novelty Iron Works, in this city. We now have before us the annual report, which presents a very gratifying exhibit. The goods—articles in common use for families—are bought by wholesale and sold at a retail price to the employees of the Novelty Works alone. Once in four months a percentage—the profits over expenses—is divided among the purchasers in a rate proportioned to the amount of their purchases. A dividend of five per cent was made Dec. 22d, 1866. The enterprise has proved to be eminently successful, giving complete satisfaction to all, and enabling the workmen to obtain their household necessaries and comforts at the lowest market prices, in addition to receiving a percentage on their purchases. In the article referred to we fully described the *modus operandi*, but if the employees of other establishments desire further information, with a view of starting a similar store, we refer them to John L. Smith, Secretary of the Association, at the Novelty Works.

Sagging of Grate Bars.

Alluding to the complaint of one of our correspondents, in our issue of Dec. 15th, that his grate bars bent and sagged to a great extent, R. J. S., of Ohio, remarks that it is customary to rest the ends of the bars on a support having a face at right angles to the bearings, so that if the grate bars should expand in length the ends would thrust against the face and tend to push out the furnace front or push in the bridge wall. Generally, however, the heated bars sag and remain bent. This face against the ends of the bars affords a lodgment for ashes in cleaning out the furnace when cold, which becomes compressed as the bars expand by heat, and offers a fulcrum for them to act against, although their ends may not reach the face of the cross bar. Our correspondent thinks the thrust faces of the supporting bars should be discarded.

California Silk Culture.

A California letter-writer ("Mark Train") asserts that "the dry, sunny, mild and balmy atmosphere of California, and especially of San Jose Valley, is unsurpassed in all the world for the production of raw silk. The mulberry tree springs up in a shorter time, flourishes more luxuriantly, and is blessed with a greater freedom from disease or blemish of any kind, in this State, than in almost any other country. Its trunk attains a circumference of two or three feet in six or seven years, and slips will grow to the hight of ten or twelve feet in a single year. When a climate can be found which insures the mulberry tree against disease, no occupation is so free from risk and so surely profitable as the silk culture; and California furnishes that climate. Therefore, there is little question that she will one day become a great silk-growing State. The State legislature has instituted very fair premiums for the encouragement of the silk interest. There were about 200,000 cocoons produced in California this year, half of them by Mr. Prevost, of San Jose. A silk manufacturing company has been formed at San Jose, machinery has been purchased, and the buildings are now in process of erection. Silk can be manufactured in San Jose, with Chinese labor, cheaper than it can be imported.

"Mr. Prevost raises his cocoons in a garret about 40 by 12, which has no ventilation, and where the thermometer gets up to 107 sometimes—a state of things which no silk worm would put up with in any other country—yet the beasts eat ravenously, live happily, and curl up in July or August and die with unalloyed satisfaction. They weave a silken winding-sheet for themselves, and always take a pride in getting it up the best they know how. If these shrouds are to be sent to the factory, the life of the imprisoned worm must be destroyed. If not, that worm turns into a very imbecile-looking and inferior quality of butterfly, and bites a hole in the end of the cocoon and climbs out. And as long as it lives, it never takes any interest in any thing but laying eggs. It lays them by the thousand, and they turn to worms and fall to eating mulberry leaves with an avidity that shows that they mean business. A hundred thousand silk worms at dinner at once make a noise with their teeth something like the racket of a steam printing press. A cocoon averages 800 yards of fiber, or 200 to 250 yards of thread—about one spool, I should say. Woven into cloth, it will make a strip of silk goods a yard long, and an inch wide."

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Subscriptions to our new Volume are pouring in from every direction far beyond our expectations, and we desire to thank our host of friends for their very generous co-operation in promoting our circulation, which is now much larger than at any time since the SCIENTIFIC AMERICAN began its existence. We shall endeavor not to disappoint the expectation of our readers. Five Editors are constantly employed on the Scientific, Mechanical and Literary departments of the paper, and are prepared to discuss all questions that belong to the character of the paper, in a plain practical manner.

Owing to the great number of claims of patents—covering about six pages—we are compelled to issue with the present number a four-page supplement. We would have gladly avoided the trouble and expense attending the supplement, but we did not feel willing to deprive our readers of the amount of excellent matter which will be found in this issue. The list of claims embraces the issues of two weeks; something that is not likely to occur again this year.

HANDLES---THEIR VARIETY AND ADAPTABILITY.

Does any one who uses some of the multifarious tools which pertain to the manipulation of the mechanic arts—to labor in all its branches—ever note the almost infinite variety of the appendages adapted to them to fit them for effective use? The handles differ as widely as the tools themselves. Without noticing the different manner in which the tools are attached to the handles, the variety in form and structure of the handles themselves, is surprising. Many of these appendages show plainly the object of their peculiarities. For instance, the scythe snath has a very crooked appearance viewed as a piece of timber, but every curve has its object. Where the handles proper are attached, it approaches a horizontal, when in use. Below the lower handle it descends at an angle, with a curvature intended to present the blade to the grass near the ground and to swing clear of the body in using. A straighter snath would compel the mower to stoop uncomfortably and add greatly to his labor.

Some handles are long, as that of the hand rake and hoe; others short, as the ax, the hammer, the mallet. But each one has its peculiarities. The handle of the carpenter's hammer is very different from that of the machinist's hammer. Those not acquainted practically with the details of the business of the carpenter and joiner and of the machinist, might not be able to distinguish, at first sight, in what that difference consisted. The carpenter's hammer is used for driving nails into a readily yielding substance. The handle is rigid; it gives a dead blow. The machinist's hammer is used on comparatively unyielding substances. If rigid it would jar and partially paralyze the muscles of the arm. For "chipping"—cutting iron by means of a cold chisel—the blow is received on the end of a steel chisel and transmitted through it to the rigid surface of wrought or cast iron. It may be called a spring blow. Soon as the hammer face strikes the chisel head it rebounds. All good chippers understand the necessity of having the hammer handle elastic. To produce this proper elasticity and graduate it exactly to the work to be performed, the workman will sometimes spend hours in rasping, scraping and sand-papering the wood. The blacksmith's hammer, on the contrary, has a stiff, unyielding handle, although used on the same material as that of the machinist. But in this case the material is soft and malleable.

Why do the handles of the sledge and the ax so widely differ in form? The ax may be nearly as heavy as a light sledge hammer and the handles of about the same length, but in no other respect have they any similarity. The sledge handle is straight and the ax handle curved. But the sledge and ax are not only used on different substances, but in a different manner. The striker grasps his sledge, one hand at the end of the handle and the other advanced, holding each to its place while the blow is delivered. He does not change the relative positions of his hands in striking. Even in delivering a swinging blow both hands remain together at the end of the handle. But see how the wood chopper handles his ax. With one hand at the end and the other in advance he swings his ax, bringing the advanced hand, with a quick, sliding movement, back to the end hand as the ax descends. Only women, unaccustomed to the ax, use it as the striker does the sledge. Now we see the reason of the downward, inward curve of the ax handle. The curve facilitates the downward movement of the hand by making the position of that portion of the handle more perpendicular as the blow is given. It is notorious among blacksmiths that the country lad, accustomed to the use of the ax, requires long practice and repeated instructions before he becomes a good striker. We recollect a laughable incident, that was nearly a serious accident, in illustration. A farmer's boy in a smith's shop was requested to aid in "upsetting" a bar at the end, the bar being laid across the anvil and held by the forger. He gave a blow ax fashion in this unusual, horizontal manner, and missing the bar, struck the stooping blacksmith full in the forehead, instantly "upsetting" him.

The advantage of a handle adapted to the work to be performed is exemplified in the difference between that of the modern shovel and spade, and that of the ancient mattock, or a spade of fifty years ago. This last was perfectly straight with a cross piece at the end. Being straight, the labor of pressing the blade into the soil was greater than it is with a curved handle, as the hand and foot were compelled to act in the same line. Besides, to retain the load on the spade or shovel, or to carry it, required a very strong grasp to prevent tilting. The downward curve of the shovel handle raises the point of suspension of the load, so that the center of gravity falls below the lifting force. The wooden grain shovel with its spoon-like scoop is a case in point. The advantage of this position of the load beneath the point of suspension can be easily tested by attempting to carry a shallow pan full of water by grasping the rim and a pail filled by using the bail.

Real science is shown as much in the form and adaptability of handles as in any mechanical device; and science is necessary: for if we examine the simple tools of savage peoples we shall see that it is not often the handles are well adapted to the work for which the tool is designed.

REMEDY FOR SMOKY AND DANGEROUS FLUES.

We are under obligation to Dr. Alex. H. Stevens of Huntington, L. I., for valuable suggestions relative to the construction of chimneys and fire flues in buildings. Most fires originating in flues, may be referred directly to the unphilosophical shape in which they have been constructed from the first, in deference to the rectangular form of bricks, and with the object of flattening them into thin walls. A given area for draft is obtained, by this form, with an excessive inner surface of masonry to abstract the heat of the ascending draft and thus diminish its force. At the same time, the corners, detaining warm air by their frictional resistance, invite counter currents of fresh air down the chimney, which not only diminish the draft proper, but increase the danger from the detention of fire, and materially assist combustion within the flue whenever a heated beam is ready to receive oxygen and burst into flame. Worst of all, the broad flat flues cannot well be avoided far enough by the timber ends set in the wall, to prevent frequent fires from their close proximity to the hot draft.

Dr. Stevens has constructed the fire flues of a number of dwellings with reference to these considerations, and as he informs us, with remarkable success. His flues were made in the form affording a given draft area with the least inner surface to abstract heat and oppose frictional resistance to the draft; leaving no corners as channels for counter currents; from each of these causes giving better draft with flues of less size; and by the size and shape of the flues permitting the floor timbers to be inserted in the wall at a safe distance from their inner surface. This form, it is unnecessary to state, is cylindrical. His experience indicates that eight inches would be sufficient diameter for the largest flues, while six-inch and even four-inch flues of this form, for ordinary dwellings, will give better drafts than those generally in use. An arrangement of three six-inch flues for one chimney, allowing four-inch timbers with the corners bevelled off to be set four inches into the wall between them, at a distance of six inches from each flue, would require an enlargement of the wall to twelve or fourteen inches in thickness, for a breadth of not more than three and a half feet. The expense of constructing a cylindrical flue need be no greater than that of a rectangular one: the mason needs nothing more than an old joint of stove-pipe to work around.

A simple contrivance for at once strengthening the draft of a smoky chimney, and so applying abundant fresh air as neither to exhaust that in the room nor reduce its temperature, was observed by Dr. Stevens in Paris when a medical student there, as long ago as 1812. It is called a *ventose*, and is nothing more than a tube of properly adjusted diameter, let down the chimney from a hole in its side near the roof, and opening directly under the fire. The descending current of cool fresh air supports a vigorous combustion, and leaves the atmosphere of the room undisturbed by currents, for the use of the occupants.

ANOTHER GREAT WORK PROJECTED.

Damming the St. Lawrence, is the topic of the day with the citizens of Montreal. Monstrous as the undertaking seems, engineers have laid it out, and capitalists are about to apply to parliament for a charter incorporating a capital of two millions of dollars for the purpose. It is needless to remark that the waterpower to be obtained by a successful accomplishment of this work would be many times greater than any other in the world, and could not fail to build up a mighty manufacturing metropolis around the present nucleus called Montreal. At the same time, the city would acquire what it must soon have by some means, a head of water and a pumping power adequate to its own supply.

The arrangements of nature to facilitate the gigantic work, are quite interesting. The Lachine rapids, just above the city, are said to afford a fall of twenty-five feet in about a mile. They are divided longitudinally by a series of islands running their entire length, and forming with the northern bank of the river a natural enclosure, lacking only the proposed dam at its lower end to make an enormous basin and to convert the rapids into a smooth mill-pond or rather lake, with a semi-Niagara at its outlet, and a hydraulic power estimated as two millions of horses. There is also another natural channel running between the islands, which admits of being made into a mill-stream of seventy-five thousand horse power. To complete the work of nature in this way, requires a dam two thousand eight hundred feet in length, leaving the southern and only navigable channel open for commerce, and the shoal rocky bed of the river below the dam, besides the shore, for the accommodation of a city of mills and factories. A great canal is also to be led inland from the new lake, to supply other factories and conduct an abundance of water to the city.

EXPLOSIONS FROM OVERHEATING BOILERS.

We have a communication from an able correspondent relative to the causes of steam boiler explosions, in which he reckons the following as a prolific cause: "The sudden formation of steam caused by a change in the position of the boiler, the sudden starting or stopping of a locomotive, the rolling of a steamer, or any sudden shock given the boiler. This formation of steam is caused by the water in the boiler being thrown suddenly on the sides of the boiler not before covered by water. An immense volume of super-heated steam is thus formed, as it were in an instant, exerting a greater pressure than that which the boiler is calculated to withstand."

We do not entirely agree with our correspondent in his views. If they were correct, explosions of the boilers of sea-going steamers should be much more frequent than they are. An article in the London *Mechanics' Magazine* puts the subject in a more reasonable light, we think. This article says:—

A great number of boiler explosions are attributed to overheating: in fact some theorists go so far as to assume this as the general cause of such catastrophes. Now this theory, taken in a broad sense, is a false one, although it is possible that a boiler may be exploded by the formation of a great quantity of steam from water thrown upon red-hot plates. But a consideration of some of the phenomena of heat places this possibility at the farthest limit, and the occurrence of an explosion from such a cause only just within its bounds. We quench the heat of a railway tire in a cistern, and why may we not as safely fill a red-hot boiler with cold water? It is surprising to see how small a quantity of steam is disengaged when a large body of wrought iron is plunged into twice or thrice its weight of cold water. Now if we reverse the operation and dispose the same weight of metal in the form of a boiler, heat it to the same degree, and throw the same quantity of cold water into it, is it not reasonable to expect that exactly the same amount of steam will be produced? If so, where would be the harm done to the boiler beyond the damage inflicted upon the iron by burning?

If we look into the matter a little more closely, we shall find that the metallic plates of a steam boiler are not capable of containing sufficient heat to change a very large quantity of water into steam. The total quantity of heat which would raise the temperature of 1 cwt. of iron through one deg. would, according to the best authorities, impart the same additional temperature to 12 1-2 lbs. only of water. And this makes it clear that overheating is not the sole cause of an explosion, although it may lead to a rupture by weakening the plates.

The writer fortifies his position by the following account of an experiment:—

An empty boiler 25 feet long and 6 feet diameter, and with the safety valve loaded to 60 lbs. per square inch, was made red hot. While in this condition the feed was suddenly let on and the boiler filled up. The experimenters expected a mighty explosion, for which they were fully prepared, but no such event occurred, the result being simply a sudden contraction of the overheated iron, which allowed the free escape of the water at every seam and rivet as high as the fire mark extended. Although we were not witnesses of the occurrence, yet arguing upon the hypothesis regarding the action of heat already referred to, we cannot hesitate to accept the fact; the more so in that we have heard of other experiments of a similar character having been made, and which were attended with similar results.

Charles Wye Williams maintained that steam in a boiler under pressure is as much in the water itself as in the steam space. He contended that in the case of an explosion the globules of steam contained in the water and confined by pressure in a medium over eight hundred times denser than the steam alone, fly into the steam space when the pressure is removed, and expand in volume in proportion to the density of the two mediums, or over eight hundred times. The *Mechanics' Magazine*, however, adopts the theory of Mr. Zerah Colburn, and says:—

In all boiler explosions, the pressure of steam is instantaneously liberated from the surface of the hot water present

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Assuming the boiler to be at work at a pressure of 45 lbs., the water will be at a temperature of about 290 deg. Now fresh water cannot for an instant be maintained at a temperature much greater than 212 deg., under the ordinary atmospheric pressure. If, therefore, the pressure upon it be suddenly liberated when heated to (say) 290 deg., a most violent disengagement of steam, and projection of water along with it, must inevitably take place. The shells of boilers are constantly liable to rupture from original unsoundness of the iron, bad riveting, corrosion by bad water, or furrowing. This being the case what are we to expect when the opening of a weak point suddenly liberates the steam pressure from 30, 40 or even 60 tuns of heated water, which are waiting below to burst partly into steam? To render the matter perfectly intelligible, we will state the distinct and consecutive operations into which, according to Mr. Colburn, a boiler explosion, although practically instantaneous, may be resolved. They are first, the rupture, under hardly if any more than the ordinary working pressure, of a defective portion of the shell of the boiler—a portion not much, if at all, below the water line. Second, the escape of free steam from the steam chamber, and the consequent removal of a considerable part of the pressure upon the water, before its contained heat can overcome its inertia and permit the disengagement of additional steam. Third, the projection of steam, combined, as it necessarily must be, with the water, with great velocity, and through a greater or less space, upon the upper sides of the shell of the boiler, which is thus forced completely open, and perhaps broken. Fourth, the subsequent disengagement of a large quantity of steam from the heated water now no longer confined within the boiler, and the consequent projection of the already separated parts of the boiler to a greater or less distance. This unique theory harmonises so well with the circumstances of steam boiler explosions, that we can admire and accept it. It is so consistent with all the phenomena attending these explosions that it leaves no room for doubt or questioning as to its soundness. It receives support from the well-known fact that boiler explosions frequently take place at the starting of the engine, when there is a sudden withdrawal of pressure in the boiler. The most conclusive evidence of the soundness of the theory, however, would be suddenly to condense steam in the steam chamber of a boiler at work, and to watch the results. If a boiler were half filled with water, and the steam got up to 30lb. or 40lb., and if a quantity of water were suddenly thrown into the steam space, the steam would be suddenly condensed, and an explosion of the boiler would doubtless follow. Such an experiment would of course be attended by considerable danger, and the object gained would probably after all be very inadequate to the risk involved. It seems to us, however, that the question has just been practically solved, and the only evidence wanting actually supplied, although under most distressing circumstances. We allude to the recent loss of the *Ceres*, in the reports of which catastrophe it is stated that the sea rushing suddenly in upon the boilers caused them to burst with fearful results. If this be correct—and all accounts agree upon the point—here is a singular though melancholy confirmation of Mr. Colburn's theory. The cold water suddenly cooled the boiler plates, condensed the steam in the steam space, relieved the pressure on the lower part, and forthwith the steam and water from below burst forth with resistless energy upon their errand of destruction.

THE COTTON MANUFACTURE---CARDING AND DRAWING.

In our last issue we traced the manufacture of cotton from its gathering to its preparation for carding, describing the preliminary process, intended mainly for cleaning it from foreign substances.

The next process is the carding. The cotton as it comes from the picker is wound, as a bat, on a core of wood. It is of a width calculated for the carding machines upon which it is to be placed. The "lap", as it is called, is placed in a frame over rollers which insure its rotation, the lap being guided by the journals of the core, in slots made in side pieces attached to the carding machine. The lap is fed into the card by fluted rollers as in the "picker," and is received by a small cylinder called the "licker-in," which is covered with card—fine wire teeth held in leather. This cylinder revolves with great rapidity, taking the fibers of cotton as presented by the lap and depositing them on the teeth of a large cylinder similarly covered with card. This larger cylinder is enclosed in a frame that supports on it, for about one-third of the circumference of the cylinder, cross lags of wood, having on their inner surfaces a layer of card, the teeth of which are bent in a direction contrary to the revolution of the cylinder. These lags are removable, being held in place by pins and adjusted to hight by set screws on which their ends rest. They must be often cleaned from the coarse and dirty fibers, which is done by an operative called a "stripper," who lifts the lags and with a hand card removes the accumulation of dirty cotton. The centrifugal motion of the large cylinder throws the heavy particles of dirt to the outside, and what is not deposited on the claw-like teeth of the lags is left in a receptacle under the cylinder. All this is "waste," of a dark gray color and filled with dust. It is used for the manufacture of coarse bagging and for similar purposes.

In the front of the carding machine and in close connection with the surface of the large cylinder is a smaller cylinder, larger however than the "licker-in," and called the "doffer," because from that the cotton is delivered after being carded. This delivery is effected by the action of a vibrating bar, armed with saw teeth, which has a vertical and horizontal movement by the action of a crank. This "comb" takes the film of cotton from the surface of the "doffer" and throws it down into a flat funnel that delivers it in an endless cylindrical belt, under a roller actuated by an endless belt, on which the cotton travels to its debouche at the end of the train. Usually this train of cards consists of a number of machines—a dozen or thereabouts—each in its own action independent, but in the delivery of their products acting in harmony. These streams, one from each card, meet and mingle together and debouch at the end of the train between iron rollers which compress them together into two flattish ribbons of white cotton.

But this product must be again submitted to the operation of carding. To do this the ribbons are combined in another "lap," by means of a winding machine, technically denominated a "lapper," and then are placed into another set of cards called "finishers," the first being known as "breakers." In these no rollers are necessary to give rotation to the "lap," as the ribbons of which it is composed have considerable tenacity and can turn the "lap" by their own strength, as it is gradually drawn into the card by the fluted feeding rollers.

The operation on the "finishers" is precisely or very nearly like that on the "breakers," and the result is similar, the cotton being delivered in ribbons, but much purified by this second operation. It looks beautiful as it pours from between the rollers at the end of the train of cards in an endless stream of snowy purity.

Now comes an operation which acts directly upon the fibers. Hitherto the object of the different processes—differing only as regards the means used, but all aiming at one result, the cleaning and purifying the material—has been to fit the cotton for its ultimate work. Now it is to be tested as to its tenacity. Machines called "drawing frames" do this work. The cotton in deep cylindrical cans is placed in front of the "drawing frames." It goes through rollers which deliver it to another series of rollers, revolving at an accelerated speed, thus drawing out the fibers and depositing the cotton in semi-cylindrical ribbons in other cans. This process is repeated on additional "drawing frames" until the cotton is drawn into delicate strips of perhaps an inch or less in width The union of the ends of the ribbons, as they empty from the cans, is readily secured by rolling them together with the hands, the union being facilitated by a slight moisture on the fingers.

In this form of a slight, untwisted ribbon, it is placed at the "speeder" or the "jack" to be drawn and slightly twisted into "roving." The "speeder," of which there are several varieties, is only a modification of and an improvement upon the "drawing frame." Neither the "drawing frame" nor the "speeder" are intended to clean the cotton: that has been done by the "picker" and the cards. The object of these is to straighten and thus elongate the fibers, and reduce the cotton in proper form for the spinning operation. The "roving," when prepared for the "mule" or the "spinning frame," is a slightly twisted thread of cotton about the diameter of a straw, wound on bobbins adapted in form to the machines upon which it is to be spun.

All these preliminary processes must be watched with great care. If the lags on the cards are too high above the cylinders they do not properly cleanse the cotton, and specks and knots and dirt in various forms combine with the product, and do not leave the material in all its future processes but show their injurious presence in the finished cloth or the thread, as the case may be. The carding department is by all odds the most important in a cotton factory. The card teeth may become dull and straightened, and it is a great responsibility to keep them in proper shape. At times they must be ground and inclined to the proper angle. This is effected by the operation of a cylinder covered with emery revolving against the surface of the cylinders of the carding machine. No less important are the results of the drawing machines. Changes of gears are provided for the sections of rollers which "draw" the cotton as it passes through, so that the weight of a given amount of cotton can be tested, and its proper "drawing" secured at any time, to insure a grade suited to the yarn that is to be spun.

In our next we shall take up the process of spinning into yarn.

[For the Scientific American.]

STOVES VS. GRATES---FRICTION NOT A FORCE.

BY PROFESSOR CHARLES A. SEELY.

STOVES VS. GRATES.

I desire to give my voice very distinctly in favor of stoves. All my considerable practical experience, and all the science I can bring to bear, unequivocally urge me to the decision I have made. Grates ought to be considered relics of the past: at the best they are only compromises between the vast fireplaces of the last century, and the perfected plans for warming houses of the present day. The advocates of grates are generally either very old fogies whose sympathies cling to what is antiquated and musty or misinformed sanitarians, whose theories are inspired by their own infirmities. But all this is not argument.

Stoves are more economical of fuel. This proposition, perhaps, was never doubted, yet I find few people who know how great the saving actually is. At least nine tenths of the heat from a grate goes up the chimney: of what earthly use to mankind are these nine tenths? I have recently made a practical test at my own house. I have two rooms of equal size, and similar in other respects; but one is warmed by a grate, the other by a stove. I find that the stove does better service than the grate with less than one fourth the fuel. A stove will generally pay its cost in a single season. The saving in kindling wood is a small item, but in the city it amounts to some dollars in the course of a winter, when a stove is used which keeps the fire all night. It is a common thing to have a stove running for weeks without ever lighting the fire.

The stove is more cleanly. All the coal, ashes, smoke and dust are snugly corked up in the stove, while the grate being open to the room, all of these have frequent chances of getting where they are not desired. The dirt from a grate ought to be intolerable to the tidy housewife.

Grates are more dangerous on account of fire, and require more attention and labor to operate them and keep them going. It is never safe, night or day, to leave the fire in a grate. The labor of carrying coal and ashes is something formidable, especially when it is to be performed by women, and the grate is up several flights of stairs. In the use of the grate, the difficulties incident to any plan of artificial warming are more than quadrupled. The consumption of four times the amount of coal by the grate, involves more than four times the amount of ashes and dirt and labor and bad temper.

But the friends of the grate plume themselves on sanitary considerations: they claim that grates are needful for ventilation. I have seen people who even pretended that there was danger of suffocation in rooms warmed by stoves. A few simple figures will show that the fundamental facts are not understood by these gentlemen. A robust man consumes 2 lbs. of oxygen in a day: 1 lb. of pure coal in burning consumes 2¼ lbs. oxygen: 2¼ lbs. oxygen represent say 150 cubic feet of air. The pound of coal therefore, burning in a stove, withdraws from the room at least 150 cubic feet of air, which of course is replaced by the air sucked in from the outside. In fact, however, the burning pound of coal brings into the room two or three times that amount. Assume that each pound of coal brings into the room 300 cubic feet of fresh air, is not that enough to expect or desire from it? Moreover in the cold season, the difference between the external and internal density being greater than in summer, the ordinary ventilating currents are more vigorous and efficient, and would probably be sufficient without the assistance of the coal. I hear very little complaint about ventilation from those who warm their houses by steam, or even from the sanitarians on those days when it is not quite cold enough to keep a fire, and yet it is prudent to have the windows and doors closed. In this last case there is little provision for ventilation by nature or art.

On the other hand, I indict the grate as being dangerous to health. It compels us to be in a gale of chilling air. On a very cold day it roasts one part of our bodies, while another may be freezing. The grate is one of the fruitful sources of coughs and the consequent diseases of the lungs.

There are those who pretend that the grate is highly ornamental, and that they like to look at the cheerful fire, etc. These are questions of taste and are not to be argued. For myself in all such cases I fall back on that homely old maxim: "Handsome is as handsome does."

FRICTION NOT A FORCE.

The new doctrine of the conservation and correlation of forces, which is now almost universally accepted, makes sad havoc with many dogmas which have prevailed for centuries. Thus our old notions of friction need complete remodelling to be made consistent with the present status of science. We now know that a force is never lost or destroyed, and consequently there can be no such thing as a resistance of force. All that can be done with acting force is to change its direction or to put it into the condition of "potential energy."

Friction does not destroy or diminish in the least the force which starts out from the prime mover. It simply changes the direction or form of the motion: the visible motion of the machine takes the form of heat, and this heat in amount is precisely equivalent to that motion which has disappeared to the eye. If friction may in any sense be considered a force, it can be only from the fact of its changing the direction or form of other forces, and thus perhaps might be brought under the category of the lever and the other so-called mechanical powers. And if in this way we regard friction as a force, how shall we measure it?

Practically it is perhaps sufficient to consider friction as simply indicating a leakage of force. A machine may be regarded as a device for conveying power from its source to a place where it is to be utilized, and friction a hole in the conductor. But the force is thereby no more destroyed, than the water which leaks out of an aqueduct.

Razors---How They Are Made.

The inquiry is sometimes made, "why does one razor cost so much more than another?" Both blades are made of steel and there seems to be but little difference in the cost of the handles. Razors are usually made of the very best quality of cast steel, properly tilted, hammered, and rolled—worth in England about $300 per ton, in gold. The forging of razors is performed by a foreman and striker in the same manner as the making of table knives.

"The bars or rods, as they come from the tilt and rolling mill, are about half an inch broad, and no thicker than sufficient for the back of the razor. The anvil on which the razor-blades are forged is rounded at the sides: by dexterously working the blade on the rounded edge of the anvil, a concave surface is given to the sides, and the edge part thus made thinner, which saves the grinder a deal of labor. The blade having been cut off the bar, the tang is formed by drawing out the steel. The blade is then properly hardened and tempered. The last and most important process which the razor-blade has to undergo is that of grinding. The difference in the prices of blades, made all of them of the same material, is owing entirely to the circumstance that stones of much smaller diameter are used for grinding the higher priced blades, and much more time and labor are given to the operation than is the case with the cheaper sorts. Thus, the best kind of razor-blades are ground hollow on stones measuring one and seven-eighths to two inches in diameter. The two-shilling English razors are ground on seven-inch diameter stones; the common shilling razors, on ten-inch diameter stones. The difference in the labor is very considerable. A grinder will turn out per week from twenty to twenty-four dozen of the common shilling razors, whilst he can manage only about five dozen a week of the better, and only a couple of dozen of the best, sort.

"The razors ground on a six-inch diameter stone are more suitable for hard, those ground on a two-inch diameter stone for soft, beards. The more common sorts are after grinding lapped on the glazer, and the backs glazed and polished.

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The three-shilling blades are polished first, then drawn over a wood buff. Razor-blades are, in a great measure, ground on dry stones, which unfortunately causes the atoms of stone and steel to fly about freely, to the great injury of the workmen, and imparts to the whole place where the operation is carried on a peculiar brownish-yellow hue. The minute particles of stone and metal flying about are inhaled by the workmen, and, lodging in the lungs, produce asthma, consumption, and other fatal diseases. This most dangerous feature of the dry-grinding business has, however, been very considerably modified of late by the introduction of an apparatus which in a great measure protects the grinders from the dust flying from the stones. This apparatus consists of a fan on the principle of a winnowing machine, with a flue to take away the dust from each of the stones in the room. The fan is worked, of course, by steam power.

"The difference in the price between the three shilling and the dearer razors is simply in the handles with which they are fitted, the blades being exactly the same in every respect. There are horn handles, ebony handles, plain and carved ivory handles, silver and German silver handles, mother-of-pearl handles, etc. Some idea of the importance and extent of this branch of the cutlery business may be conceived from the fact that some 1500 different patterns of razors are made.—*England's Workshops.*

GLEANINGS FROM THE POLYTECHNIC ASSOCIATION.

Reported for the Scientific American.

The regular meeting of this branch of the American Institute, was held on Thursday evening, December 27th, Prof. Tillman presiding.

THE EARTH A SOLID SPHERE.

After some preliminary proceedings, Mr. Wood read an article, arguing that the interior of the earth is in a solid state, yet having an intensely high temperature. Mayer has shown that when a globe of matter is once in a molten condition, in cooling one common temperature must exist throughout the entire mass; that from its nature one part can not possibly cool faster than another, and even if it were possible, we should look for the first signs of solidification at the center. The formation of the earth's crust, inclosing a molten mass, is hence inadmissible. The temperature certainly increases as we go toward the earth's center, but the pressure becomes greater in an increased ratio, and this latter force prevents the interior matter from assuming the liquid form.

The statement accredited by the speaker to Mayer was disputed by several members, and the existence of molten lava coated with a crust of varying thickness was brought forward as a notable example to sustain this latter view. After some further discussion the society listened to a paper by Prof. R. P. Stevens.

THE IMAGINARY SCHOOL OF PHILOSOPHERS.

Investigation, or the discovery of new facts, principles or truths, must always be conducted with a rigid adherence to truthful experiments. Standing on the borders of the known, we may patiently gather from the unknown, till from the accumulation we are enabled to classify, generalize, and reason, and thus extend our bounds.

It is interesting to show from the past how men of so-called science have found it so much easier to call on their imagination for facts from which to form or support theories, than by continued labor to discover their actual existence.

According to the Phœnician, Sanchoniathon, Chaos and a spirit were the authors of all things. The spirit fell in love with his own principles, hence a commixture, hence an agent capable of performing all we see in nature. The stoics supposed that moisture was the medium through which Deity acted on matter. *Ab mare omnia* was the belief of Ocken, and Prof. Grimes must be ranked in this school, as by his theory the continents are born of the sea. Even Kepler speaks of an animal in the moon drawing the earth toward it. Leibnitz imagined nomads endowed with inward energy and spontaneity, and each a perfect world within itself. Herschel and Laplace call to their aid cosmic matter so attenuated as to fill all space. Aristotle and Epicurus taught that matter was eternal and the world without beginning. The Pantheists hold essentially the same views.

The imaginary school continued with unabated force till Bacon established his inductive philosophy, teaching to observe facts, institute experiments, and from effects reason to causes.

THE NEBULAR THEORY.

Against the nebular hypothesis of Laplace, the following objections were urged. "The impossibility from *known* facts, of matter being so attenuated as to fill all space. It is doubtful that if so attenuated there would be many centers or even one center of gravity. If in this state and heated to so high a temperature, there could be no commingling of gases. We have no reason to suppose matter endowed with motion; rather, that unless moved upon by an extraneous force it would remain quiescent. The *primum mobile* of the centrifugal and rotary forces is merely assumed. The hypothesis fails to account for the eccentric movement of Herschel and Neptune, the movement of Herschel's moons, the movements of the comets, and their unequal rapidity of motion. It is opposed to all our present knowledge of matter as now existing, and this we have reason to believe is but a reappearance of itself in successive phases or rounds of phenomena, manifested by chemical changes and reactions.

THE OCEAN CURRENTS.

The first statement made by Prof. Grimes was that the ocean primitively covered the globe. Physicists calculate that had this ever been true, the sea would have been from one to two miles deep, too deep to fortify his second assertion, for currents do not abrade in deep water, hence the forming of vast continents by them is absurd. His second statement was that currents in this primitive ocean moved in six ellipses. We do not know the conditions attending the movement of currents in a shoreless ocean, and the mechanical problem proposed to account for this elliptical motion can not be shown by experiment. In the North Atlantic the current is exhausted at the 45th degree of latitude: then how was land above this parallel formed? Finally, he has not cited one fact or illustration from geology that has the remotest application to his hypotheses.

[For the Scientific American.]

BOSTON INSTITUTE OF TECHNOLOGY.

IMPROVEMENT IN TELESCOPES AND MICROSCOPES.

At the second regular meeting of the Boston Institute of Technology, a miniature telescope was exhibited (the invention of Mr. Tolles, the celebrated maker of microscopes,) four inches long, with an object glass only seven tenths of an inch in diameter, and magnifying thirteen diameters. This was proved equal in power to ordinary telescopes of two inches diameter of object glass and four feet long. In this small instrument the satellites of Jupiter and similar astronomical objects had been seen. This invention tends to diminish by one half the cost of telescopes, by diminishing the size of the lenses. Mr. Tolles had also invented a method of throwing light upon an opaque object when under examination under the microscope, by means of a rectangular prism introduced into the side of the instrument just above the lower glass, so that the light is thrown directly down upon the object; a long sought for improvement in the examination of opaque objects.

A NOVEL PLAN FOR FIRE-PROOF SAFES.

At a meeting of the Massachusetts Institute of Technology, in December, 1866, Rev. Rufus S. Sanborn, of Wisconsin, exhibited and explained a fire-proof safe invented by himself, in which steam acts as the preserving medium.

The nature of this invention consists in placing one or more boxes, or unfilled safes, one within the other, the outside case being filled or otherwise in the ordinary way, and these inner boxes detached from each other and the outside case by means of flanges or spurs, so as to form air chambers all around said inside box or boxes; and into these air chambers are inserted metallic vessels for holding water, with simple steam valves, which will be opened so as to allow the steam to escape when the heat of the inside of the safe shall become sufficient for that purpose.

This steam saturates the air chambers, and its surplus escapes by the doors, so as to keep the temperature of the inside of the safe about that of boiling water, in which temperature none of the papers of the inside box can either burn or char so long as any steam can be maintained.

By a peculiar arrangement of a succession of these vessels, one is exhausted after another, and thus for a long time there is the most complete protection in addition to the other protection which the filling and air chambers afford. In an ordinary sized safe there would be about fifteen gallons of water, which, under the arrangement described, would require a very long time for its conversion into steam and its total escape by the door.

A trial has since been made, of six hours' duration, in a fire so intense as to melt the knobs from the door, the safe being kept red hot for over five hours. In the trial, a safe of one of the best makers, on being opened after three hours' exposure, presented all the interior wood work on fire and its contents completely destroyed: on the contrary, the Sanborn safe showed its contents entirely uninjured, and its steam would have formed a perfect protection for six times, at least, the time of the exposure. An account of the trial may be found in the Boston *Advertiser* of Dec. 24, 1866. K.

A NEW EARTH EXCAVATOR.

Mr. B. A. Oliver, of Bunker Hill, Ill., has sent us a model of what appears to be an excellent machine for cutting ditches, canals, and railways, and also for grading roads, etc. It can be very easily described, being simple in construction and operation. A platform supports an upright frame, in which revolves a disc, carrying on its outer circumference a number of scoops closed at one end. In front of the machine are two plows with side attachments for cutting down the bank, which may be fixed to cut a perpendicular wall or one inclined at an angle. The shape of the plow shares is such that the earth loosened is thrown directly in the path of the revolving scoops. These take the earth up and carry it over the top of the disk, discharging it at the rear in two windrows, one on each side of the excavation. This division of the debris is secured by a partition passing through each scoop in the direction of its rotation, and also by doors on the sides of the scoop which, while in the act of digging, are closed automatically by side fixtures like cams, and are opened when in the proper position by the same means.

The large central disk to which these scoops are affixed has neither spokes nor hub, but is kept in place and rotated in a vertical plane by means of two friction wheels. Inside, the disk is furnished with segments of cogs in which a cog-wheel meshes, which is revolved by suitable connections with the main axle. The driving power is the supporting wheels of the apparatus, which have projecting lugs on their outer peripheries. The machine is drawn by horses or oxen, attached so that the animals walk on each side of the excavation. Direction is given to the machine by means of a lever in front of the driver's seat.

The principle of the machine seems to be correct, and Mr. Oliver has succeeded—so far as can be judged by his model—in applying it in a practical and efficient manner. He desires to procure some party to assist him in taking out his patents and introducing the machine to the public, and is willing to cede a portion of his rights as inventor, for the accommodation.

How to Straighten Hardened Steel.

To straighten steel after it has been hardened is a great annoyance to the machinist. It is one thing to finish a tool or mechanical appendage requiring hardening, and another to bring it out, hardened as it should be, right. Many a drill, turning tool, tap, etc., is ruined simply for want of knowledge of this art. To be sure, the bulk of the responsibility rests with the temperer or hardener; but what they fail in may in many cases be remedied by a knowledge of simple fact.

To straighten a piece of steel already hardened and tempered, heat it lightly, not enough to draw the temper, and you may straighten it even on an anvil, if not really dead cold, by a hammer; but it is best to straighten it between the centers of a lathe, if a turned article, or on a block of wood with a mallet, where the article, cold, would break like glass. Warm, it will yield readily to such blows as are said to kill the devil easy.

The Gatling Gun.

This destructive piece of field ordnance, of which we gave a description and engraving in the last number of the SCIENTIFIC AMERICAN, with an extract from the emphatic testimonial of the Examining Board to its efficiency, has been adopted by the U. S. Government, and an order for one hundred of the deadly machines for the army, is now being filled at Colt's Armory, Hartford.

PLANING CURVED SURFACES.—Hitherto, it has been found impossible to adapt the ordinary planing machines for curvilinear planing, but at length this problem has been solved by Mr. Middleton, the head of the machinery department in Chatham dockyard, who has succeeded in planing the whole of the curves and angular surfaces of the iron stem-piece for the *Monarch*, with no other appliances than the common planing machine.—*Engineer.*

[Links for locomotive valve gear have been planed for years in our machine shops on common planers, and by half a dozen different methods. It is no trouble at all. A common way is to take the vertical screw out of the tool holder, and attach a rod to the slide, with the bottom of said rod working in a curve of the required radius formed in a piece bolted to the bed of the planer.—EDS.

THE shop is getting to be only a primary school for mechanics. Time was when to be a first-class workman—capable of handling the file, or running the lathe or planer, or better still "doing a job"—was the hight of a mechanic's aspirations. All is changed. The mechanic, to be worthy of the name, must be more than a mechanical workman. He must understand the principles of his business and must be capable of not only doing a job, but preparing it and directing it. The world needs scientific mechanics as well as mechanical mechanics.

LIGHTING CIGARS.—The pyrophorus used for lighting cigars is a highly combustible powder, requiring only exposure to air and slight warmth to ignite. It is preserved in a small tin case with a narrow orifice, from which a little is dropped on the end of the cigar, and ignited by the aid of the breath. It seems to be even more dangerous to property than he cigar itself.

LAUNDRY GLOSS.—The beautiful finish of linen got up for sale is imparted by pressure and friction upon curved surfaces of hard pasteboard. Try a true cylinder, or convex table, veneered with the best quality of press board, such as printers use, instead of the usual domestic "ironing sheet."

HOT AND COLD BLAST.—An inquiry instituted by the British Association has determined the ratio of strength in hot-blast iron as 1,024.8, and of power to sustain impact as 1,226.3, to 1,000 in cold-blast iron.

SYRACUSE papers say, that the water in the fire engines of that city is kept constantly hot by jets of gas which are brought into contact with the boilers. It is said that gas costs in Syracuse only a dollar per thousand.

MR. SPILLER, of the Woolwich arsenal, has remarked that the barrels of the rifles used by the volunteers there are strongly magnetic. The range at which they are fired is situated due north and south.

A COSMOPOLITAN bank, whose checks will be everywhere at par or premium is to be established at London, with branches in the leading cities of the world. This will do away with bills of exchange.

A LOCOMOTIVE exploded lately at Rochester under a pressure of ninety pounds, and was thrown across the street into a saloon without doing much damage.

AN excellent bronze for small castings may be made by fusing together in a closed crucible ninety-five parts of copper by weight, and thirty-six parts of tin.

FORTY tons of rust were taken out of the Menai tubular bridge at one thorough cleaning.

IT has been calculated that 96,000 pounds of candles are used weekly in the mines of Cornwall.

M. PISANI proved the presence of soluble hyposulphates in the aerolite which fell at Orgueil.

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ISSUED FROM THE U. S. PATENT OFFICE

FOR THE WEEK ENDING JAN. 1, 1866.

Reported Officially for the Scientific American.

PATENTS ARE GRANTED FOR SEVENTEEN YEARS, the following being a schedule of fees:—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Reissue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing a Disclaimer	$10
On filing application for Design (three and a half years)	$10
On filing application for Design (seven years)	$15
On filing application for Design (fourteen years)	$30

In addition to which there are some small revenue-stamp taxes. Residents of Canada and Nova Scotia pay $500 on application.

☞ Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & Co., Publishers of the SCIENTIFIC AMERICAN, New York.

60,658.—FASTENING SLEIGH BELLS.—J. H. Abell, East Hampton, Conn.

I claim the spring hooks, b, of the catch, B, adapted to enter the slot, a, of the bell, and hold the bell by the expansion of the shanks of the hooks, in the manner and for the purpose specified.

60,659.—SCAFFOLD.—D. D. Adams, Brookline, Mass.

First, I claim an improved scaffold formed by combining the front rails, C, the central rails, A, the back rails, D, the side bars, B, the pawls, H, the corner blocks, E, and connecting rods, I, with each other, the various parts being constructed and arranged substantially as described and for the purpose set forth.

Second, The combination of the braces, K, and brace hangers, L, constructed as described with each other and with the side bars, B, and front rails, C, substantially as described and for the purpose set forth.

60,660.—APPARATUS FOR COATING FABRICS WITH FLUID OR SEMI-FLUID SUBSTANCES.—George Adamson, Philadelphia, Pa.

I claim the employment, substantially in the manner described, of the gum-elastic roller, D, and the rigid roller, E, for transferring fluid or semi-fluid substances to fabrics in the manner described.

60,661.—BOAT-DETACHING APPARATUS.—N. B. Allen, New port, R. I.

I claim the hooks, C, which are secured to the bars, A, or their equivalents D E, and which are operated by the lever, B, substantially as and for the purpose herein shown and described.

60,662.—STEAM GENERATOR.—W. D. Andrews, New York City.

I claim a boiler having a fire-place extending over its entire horizontal area, with the exception of a narrow water space surrounding it and a series of tubes, whether one or more, passing horizontally through the water-space above the fireplace, when the said fireplace and the said tube or tubes are connected by and communicate through a combustion chamber formed outside the boiler, having openings, adjustable or otherwise, for the admission of atmospheric air thereto and an opening or openings passing through the water space surrounding the fireplace and communicating with the latter, when the whole is constructed and arranged so as to operate substantially in the manner described and for the purpose specified.

60,663.—RULING PAPER BY ELECTRO-MAGNETISM.—Ellicott D. Averell, New York City.

I claim the application of an electro-magnet for the purpose of ruling paper in combination with the circuit breaker finger, F, in the manner and substantially as described in the foregoing.

60,664.—CARTRIDGE RETRACTOR FOR BREECH-LOADING FIRE-ARMS.—Albert Ball (assignor one-half to Windsor Manufacturing Company), Windsor, Vt.

First, I claim the carrier block, B, in combination with the shoulder, v, of the rotating ejector, or equivalents, for the purpose of creating the gradual movement of the cartridge shell when carrier block is being swung open, as described.

Second, I claim the operating spring, S, in combination with the notch, n, and shoulder, w, of the rotating ejector or equivalents, for the purpose of creating the jerk movement and restricting the same, as described.

Third, The combination of the spring, and hinge, and ejector, to hold the carrier block open or shut.

Fourth, The combination of the spring, and hinge, and ejector, and carrier block and ways, to cast the cartridge shell out when the ejector is operated by opening the carrier block, as and for the purposes, substantially described.

60,665.—REFRIGERATOR.—G. A. Banta, New York City.

First, I claim an ice box for a refrigerator lined with slate, in combination with air passages surrounding said ice box, through which air circulates to and from the refrigerator and is cooled by contact with the exterior of such slate ice box, substantially as specified.

Second, In a refrigerator, I claim the perforated trough, m, receiving the water that comes from the ice box, and delivering it through a series of small holes so as to flow over the outside of a barrel or other vessel for cooling its liquid contents, as set forth.

Third, I claim a receptacle for water in a refrigerator, formed of slates in the manner specified, so that the water shall be cooled by the air circulating in contact with its exterior surface, as set forth.

Fourth, I claim the ascending air passage, 7, and descending passage, 8, in combination with the ascending air passages, 10, and descending passages, 12, whereby the air is caused to travel around the ice box, in passing to and from the chamber of the refrigerator as set forth.

Fifth, I claim the valve, 13, in combination with the air passages, 11, and 14, whereby said valve can be employed for closing the passage, 11, for ventilating the refrigerator or opening it for effecting a circulation of the air as set forth.

60,666.—GRAIN DRYER.—A. H. C. Barber, Clinton, Ill.

I claim the hollow rings, G, and connecting pipes, H, constructed as described in combination with each other and with the furnace of a drying kiln, substantially as described and for the purpose set forth.

60,667.—PEAT MACHINE.—N. H. Barbour, New York City. Antedated Dec. 21, 1866.

I claim the revolving annular cylinder, A, provided with a series of holes, a, and plungers, B, which revolve with said cylinder in combination with the hollow shaft, E, stamp seat, G, and cams, H J K, constructed and operating substantially as and for the purpose described.

Second, Feeding the material to be compressed through one end of the hollow shaft and discharging it through the other, substantially as and for the purpose set forth.

Third, Making the cam, H, adjustable substantially as and for the purpose described.

60,668.—GROOVED WHEEL OR PULLEY.—John H. Barnes, Brooklyn, N. Y. Antedated Dec. 2, 1866.

I claim a grooved wheel or pulley having the opposite sides of the groove entirely cut away or removed, substantially as described, so as to permit the wheel or pulley to be cast or struck up, substantially as and for the purposes set forth.

60,669.—SEWING MACHINE.—W. B. Bartram, Danbury, Conn.

First, I claim the looping hook, E, when arranged in a sewing machine having a reversible feed so as to move in a plane at right angles to the line of feed, and so timed to the movement of the needle that the two will operate in proper relation to each other without regard to the direction in which the feed is moving.

Second, The combinations of the driving wheel, D, and pulley, C, of a sewing machine when they are arranged so that the distance between them may be varied by sliding the machine sideways upon its table, and securing it by the devices shown.

Third, I claim the adjustable tension cylinder, O, constructed and operating substantially as set forth.

Fourth, The combination of the eccentric groove in the pulley, L, the ring, M, fitted loosely in the said groove, and the pin, N, through which the needle arm is actuated.

Fifth, The combination with a rectilinear feeding dog of a sewing machine, the tapering notched lever, J, and eccentric pin, I, substantially as and for the purpose set forth.

60,670.—CAPILLARY MATERIAL FOR FILLING GAS AND AIR CARBURETTORS.—John A. Bassett, Salem, Mass.

I claim an absorbent and capillary material for gas and air carburettors, composed of the substance described and prepared substantially in the manner set forth.

60,671.—MEANS FOR RECOVERING SUNKEN SHIPS.—Ernest Bazin, Paris, France.

First, I claim the gigantic cast net, A, or analogous apparatus, by means of which the wreck or sunken vessel may be seized or grappled, in combination with the circular tube, B, covered with cloth in caoutchouc or any other kind of supple or waterproof material, sustaining the net and allowing of its extension on the surface of the water, substantially in the manner and for the purpose herein set forth.

Second, The floating tubes, E in combination with the air tube, B cast net, A, to sustain and spread it out on the surface of the water, substantially as and in the manner hereinbefore described.

Third, The lifting buoy, K, traversed by a chimney, so as to guide its immersion in a vertical manner, substantially as hereinabove described.

Fourth, The boating buoy, R, in combination with the lifting buoy, K, the former serving to sink and lower this latter on to the sunken vessel, substantially as hereinbefore set forth and described.

Fifth, The cables, Y, serving to build up the temporary chimney, Q', in order to facilitate the moorings above water, in combination with the lifting buoy, K, so as to connect the cast net with the lifting buoy, K, substantially as hereinbefore set forth and described.

Sixth, The raft, serving to emerge the wreck, substantially as hereinbefore described and represented in Figs. 9 and 10, in combination with the embankment, A', substantially as described.

60,672.—PROCESS FOR GLAZING PAPER.—Frederick Beck, New York City.

I claim the within-described process of treating paper with stearic acid, substantially in the manner and for the purposes set forth.

60,673.—DOOR FASTENING.—Matthew Bennett, Kilbourne City, Wis.

I claim the combination of the devices constructed and arranged as described.

60,674.—GAS BURNER AND REFLECTOR.—Herman Berg and Andrew Blessing, Springfield, Mass.

I claim as a new article of manufacture a gas burner, having a globular or dome-shaped reflector arranged between the lights of the same, substantially as herein set forth.

60,675.—SINK.—L. C. and M. C. Bignall, Medina, N. Y.

We claim the sink basin, A, when constructed with flanges, a, curved or recessed on the under side to receive the ends, b, of the boards which form its support, and with right-angled exterior corners, c, to correspond with the square or rectangular top of the wooden support, and the rounded interior corners, d, combined and arranged substantially as and for the purpose set forth.

We also claim, in combination with the sink basin, A, the extension frame, I, formed of a continuation of the sides of the basin and flange, a, and provided with the shelf, C, to form, in connection with said basin and its support, B, a seat or bearing for the pump, when arranged substantially as set forth.

60,676.—HARVESTER.—Virgil U. Blanchard, Bridport, Vt.

First, The arrangement of the collar, D, with the wheels, E or F, attached, or both the sliding parts, a a', or their equivalents, of the clutches, G G', and the spring, H, or its equivalent, all placed on the axle, C, to operate in connection with the pinions, I or J, or both, substantially as and for the purpose set forth.

Second, The clutches, G G' L L' and O O', when combined and arranged with sliding collars or sleeves, and with variable or differential gearing, substantially as and for the purpose specified.

Third, The curved bar, E*, in combination with the adjustable guide, F*, arranged as shown for the purpose of elevating or depressing the front ends of the fingers or guards, as described.

Fourth, The arm, K*, connected to the rear side of the curved bar, E*, as shown, in combination with the adjustable guide, F*, connected with the bar, E*, as shown for the purpose specified.

Fifth, The bar, H*, connected to the upper side of the bar, E*, by a hinge or joint, c*, and provided with India-rubber spring, d*, as shown, in combination with the lip, b*, on the adjustable guide, F*, substantially as and for the purpose described.

Sixth, The grain-discharging device composed of two shafts, P* Q*, arms, Y*, arranged with the chains, X*, and pulleys, Z*, and operated automatically from the axle, C, or other suitable driving shaft, by the lever, R*, pin, b**, substantially in the manner as herein set forth.

60,677.—VENTILATOR FOR MINING SHAFTS, BUILDING, ETC.—Thomas Boyd, Cambridgeport, Mass.

I claim the method of ventilating buildings, etc., by the use of a metallic chamber conducting the heat of the sun's rays to the air within the same, with or without glazed orifices, operating substantially as described.

I also claim the combination of the above-described metallic chamber having glazed orifices, with an interior metallic surface, whether globular or of other form, so arranged as to receive the heating rays of the sun and radiate the heat to the air within the chamber, substantially as set forth.

I also claim the employment of orifices in the metallic chamber fitted with plain glass, lenses or other translucent material, to allow the direct transmission of the sun's rays to the air within the said metallic chamber, operating substantially as described.

I also claim, in combination with the above, the vibrating cap, G, operating substantially as described, for the purpose set forth.

I also claim the use of the tubes, a b, so arranged as to produce a rotary motion of the air within the chamber, A, substantially as described.

I also claim the use of one or more twisted or smooth tubes, e f, in combination with the chamber, A, substantially as and for the purpose set forth.

I also claim introducing artificial heat from a furnace or other heating apparatus into the hollow ball, D, and chamber, A, so as to heat the same and increase the upward current in the absence of the sun's rays, substantially as described.

60,678.—GATE.—J. R. Breese, Middletown, N. Y.

I claim attaching the gate, B, to the gate post, A, provided with a diagonal guide, as described, by means of the crossed bars, C D, arranged and operating substantially as and for the purpose specified.

60,679.—FURNITURE POLISH AND RESTORER.—Geo. Bricker, Sr. (assignor to himself and S. J. Irwin), Newville, Pa.

I claim a furniture polish or polish restorer compounded of an alcoholic solution of gum and gall, substantially as described.

60,680.—COAL OIL STOVE.—F. M. Brown (assignor to himself and James F. Griffin), Chicago, Ill.

First, I claim the reversible heat deflector, E, arranged and operating substantially as and for the purpose specified and shown.

Second, In combination with a stove constructed substantially as herein described, I claim the burner, L, provided with a passage beneath the perforated partitions, a, to effect an equal diffusion of the oil through the burner, when arranged and operating substantially as set forth.

Third, I claim in combination with a burner, I, constructed as described, the reservoir, J, the tube, M, provided with a slot, m, and the plug, N, operating substantially as and for the purpose set forth.

Fourth, I claim the combination of the deflector, E, and plate, D, when arranged within the stove, substantially as described.

Fifth, In combination with a stove constructed substantially as described, I claim the plate, A, and passage, B, when arranged substantially as and for the purposes set forth.

60,681.—HAND PEGGING MACHINE.—J. Hamilton Brown, Watertown, Mass.

I claim the plunger, F, made hollow for the reception of the spring, d, substantially as and for the purpose set forth.

I also claim the plunger, F, with its exterior surface so formed as to give to the lever, J, the required movements for causing the knife, E, to cut a single peg on the commencement of the downward stroke of the plunger, for the purpose specified.

I also claim the plunger, F, with its groove, K, and exterior surface so formed as to cause the lever, K, to operate the feeding point, substantially as set forth.

I also claim the table, L, so formed that in connection with the lever, K, a uniform sliding and rocking motion, viz., down and forward, up and back, will be given to the feeding point, for the purpose described.

I also claim the gage plate, O, operated by its spring, t, and having the lower end, g, of its shank so formed as to fit snugly a slot of corresponding form in the plate, M, by which it is prevented from turning therein when in use after adjustment, substantially as described.

I also claim the pin, 12, or its equivalent, for performing the double office of keying the awl and peg driver to the plunger, as set forth.

I also claim the removable head, G, for confining the spring, d, within the plunger, F, substantially as described.

60,682.—SEWING MACHINE.—L B. Bruen, New York City.

First, I claim the devices described, attached to the cloth plate of elliptic-hook machines, constructed and operating substantially as explained, for forming double loop and three or more thread stitches thereby at pleasure.

Second, The combination of cloth plate, D, elliptic hook, F, with or without bobbin, G, needle arm, C, thread carrier, P, and the other usual and essential operative parts of elliptic-hook machines, constructed and operating together substantially as and for the purposes described.

Third, Removers, S, to withdraw the threads from the line of travel of the hook, substantially as described.

60,683.—MAKING REAMERS.—Wm. Burlingame, Exeter, N. H.

I claim the reamer consisting of the cast-iron body, A, steel cutters, B, and steel shank, C, when constructed as herein shown and described, as and for the purpose specified.

60,684.—CRIB AND WALKING STOOL.—Sanford S. Burr, Dedham, Mass.

I claim the combination of a crib or cradle with a walking stool in one piece of furniture, constructed and operated substantially as above described and for the purposes above set forth.

I also claim the frame, A B and C, resting upon caster, b, and connected by pivot at o with the top, H, and its connections, and by a bar, D, with the rocker, F, substantially as herein shown and described.

I also claim the rocker, F, attached to a walking stool, constructed and operating substantially as herein shown and for the purposes above set forth.

I also claim the top, H, with its connections, J and K, pivoted at o, constructed and operating substantially as herein shown and for the purposes above set forth.

60,685.—OIL FILTER.—Wm. Cady, Marietta, Ohio.

First, I claim the process substantially as herein described of filtering and depriving petroleum of its earthy impurities by passing the same under a head or pressure, through a suitably heated medium or fluid of superior density, in an upward course or direction through a filtering diaphragm or medium, essentially as herein set forth.

Second, The combination of the oil tank, A, and filtering vessel, D, having a lower chamber, O, covered by a filtering cloth or diaphragm, also provided with a suitable heating device or contrivance and arranged below the level of the tank with which it is connected, substantially as and for the purpose herein set forth.

60,686.—MOLDING TURBINE WHEELS.—James Cairnes, Philadelphia, Pa.

I claim forming the molds for the buckets of turbine wheels by means of the cores, C, without the use of a pattern, the said cores having a close fit outside of the bucket spaces, b, as and for the purpose specified.

60,687.—ELASTIC HOOF PAD.—F. B. Carleton, Cambridge, Vt.

I claim as a new article of manufacture an elastic hoof pad constructed substantially as described and represented.

60,688.—BROOM HEAD.—Thos. B. Carroll, Noblesville, Ind.

First, I claim the combination of the core, a', core, B, wires, C D, and cam, F, secured thereto as described, and flanged cap, G, substantially as and for the purpose specified.

Second, The combination of the projecting wires or railings, C and D, with the metallic core, B, substantially as described and for the purpose set forth.

60,689.—ICE-CREAM FREEZER.—A. Carileer, Wm. McCuddy, and P. N. Woliston, Springfield, Ohio.

We claim, First, The hollow tube, D, open at the bottom and surrounding the pivot od, E, constructed as described, operating with the revolving cylinder, B, in combination with plate, G, pins, d, and strips I, to which upwardly inclined lifting plates, f f, are secured, all substantially as described, for the purpose specified.

Second, The cover, C, and crank, a, connected together substantially as and for the purpose specified.

60,690.—COMBINED SQUARE AND LEVEL.—G. L. Chamberlin, Marietta, Ohio.

I claim the block, A, having a graduated semicircular plate, C, at one or both sides, and a level, B, inserted in one edge, in combination with the adjustable frame, D, applied to block, A, substantially as and for the purpose herein set forth.

I also claim the adjustable or sliding bar, E, in combination with the shaft or arbor, b, to which the frame, D, is attached, substantially as and for the purpose specified.

I further claim the pins, g, on the projection, L, of one of the strips, d, of the frame, D, in combination with the spring, h, in block, A, substantially as and for the purpose set forth.

60,691.—PAINT MILL.—Charles Clifton, Jersey City, N. J.

I claim, First, The cylinder, A, in combination with the grinder or pulverizer, O, when arranged together and operating substantially as and for the purpose described.

Second, The grinder or pulverizer, O, when made hollow, substantially as and for the purpose described.

Third, The spiral screw shaft or conveyor, W, or its equivalent, when arranged within the stationary center shaft, C, on which the cylinder, A, revolves or turns, substantially as described, for the purpose specified.

Fourth, Removing the material ground in the cylinder, A, from the same through a pipe or tube, I 2, arranged or formed within the center and stationary shaft, C, so as to form a communication between the inside and outside of the cylinder.

60,692.—HARVESTER.—Wm. F. Cochrane, Springfield, Ohio.

I claim the side pieces of the frame with the segmental slots formed in them made in one piece, substantially as described.

I also claim the segmentally slotted frame arranged between the wheels and in combination with the main axle of the machine, substantially as described.

I also claim the employment of the main axle as a rock shaft, in combination with the segmentally slotted frame, sliding up and down on said axle, substantially as described.

I also claim the slotted lever, K, or its equivalent, connected to and operating the main axle and frame of the machine, substantially as described.

I also claim the combination of the slotted lever and adjusting stirrup with the segmentally slotted frame, substantially as described.

I also claim the adjusting stirrup in combination with a toothed rack, and a segmentally slotted frame for locking the said frame when the cutting apparatus is adjusted to the desired hight, substantially as described.

I also claim the divided boxes or bearings for the crank shaft in combination with the divided tubular transverse pieces or girders and the through bolts or their equivalent, substantially as described.

60,693.—HARVESTER.—Wm. F. Cochrane, Springfield, Ohio.

I claim the combination of the main frame of the machine with the tongue and main axle in such manner that said frame may be raised and lowered bodily, maintaining its parallelism with or relation to the ground at whatever hight therefrom it may be adjusted or set, substantially as described.

I also claim the combination of a pivoted swinging yoke with a segmentally slotted frame, arranged to slide up and down on the main axle, substantially as described.

I also claim the combination of geared segments with a segmentally slotted frame which is adjusted up and down on the axle, substantially as described.

I also claim the main axle provided with pinions and made to operate as a rock shaft, by which through geared segments or their equivalents to raise and lower the slotted frame, substantially as described.

I also claim the pivoted swinging yoke in combination with the tongue and slotted frame, substantially as described.

I also claim a swinging yoke attached to the tongue and frame, made adjustable for varying the movements of the frame in raising and lowering the cutters, substantially as described.

60,694.—RAILWAY-CARRIAGE WINDOW.—Elisha T. Colburn, Boston, Mass.

I claim the arrangement and application of the auxiliary sashes, C C', with the window sash, B, or its equivalent, substantially in manner and by means as specified.

I also claim the combination as well as the arrangement of the window frame, the main sash, B, and the auxiliary sashes, C C', applied together and to the main sash substantially as specified.

60,695.—BURGLAR ALARM.—Geo. A. Colton, Adrian, Mich.

I claim the arrangement of the spring, M, with its stock, L, in combination with the escapement or pallet, G, substantially as and for the purpose described.

I also claim the hook, O, or its equivalent, in combination with the above, substantially as described and for the purpose specified.

60,696.—JOURNAL BOX.—James Connolly, Boston, Mass.

I claim the combination of the box or bearing, a, the reservoir, d, and the enlarged extensions or cups, f, when of size sufficient to receive and protect the shaft collars, i, and when cast in one piece, substantially as described.

60,697.—SAW SETS.—Thomas Connolly, New York City.

First, I claim, in combination with the jaws, A A, the two levers, F F, with the two steel punches, G G, which are attached to the levers and which operate simultaneously upon the teeth of the saw, in the manner as set forth.

Second, I claim also the small thumb screw, Q, in combination with set screw, P, and jaws, A A, all constructed and arranged as set forth.

Third, I claim the two thumb screws, I I, in combination with the jaws, A A, and levers, F F, constructed and operating in the manner as set forth.

Fourth, The arrangement as described of all the parts so that the device may be adjusted to set the teeth of either fine or coarse saws accurately, and otherwise operate as set forth.

60,698.—BREECH-LOADING FIRE-ARMS.—Silas Crispin, New York City.

I claim as new in that class of breech-loading fire-arms which have the charge chamber bisected as described and shown, the recessed rear portion, 2b', in combination with the ribbed and recessed forward portion, a1', of the charge chamber, the whole constructed and operating together to receive and retain while being fired the kind of cartridge herein referred to.

60,699.—MANNER OF HANGING MIRRORS.—W. C. Cumming, Peekskill, N. Y.

I claim the slotted and notched sleeves or tubes, F, whether one or more, for the rod, D, to which the mirror is attached, substantially as and for the purpose specified.

60,700.—BUTTON-HOLE CUTTER.—C. N. Cutter, Worcester, Mass.

I claim the cutter blade, D, adjustable graduated cutter blade, D2, pivot, c, set screw, G, and slot, d, in combination with the handles, A A, and screw, N, so that a button hole may be cut any length without measuring, substantially as herein set forth.

60,701.—TANNING.—J. Davis and J. McKelvey, Pawtucket, R. I.

We claim the described improvement in the process of tanning.

60,702.—WOOD-SPLITTING MACHINE.—John Davock, New York City.

First, I claim the rotary spindle, G, with the attached knife, L, or knives in combination with the crosshead, F, arranged substantially as herein shown and described.

Second, In combination with the rotary spindle, G, I claim the vertically sliding rod, t, operated by the cams, s s', etc., substantially as and for the purpose herein specified.

Third, The combination of the crosshead, F, with the lever, H, rack, e, connecting rod, f, and toothed wheels, O O', the whole being arranged and operating substantially as and for the purpose herein set forth.

Fourth, I claim the arrangement and combination of the feed rollers, M M', endless belt, y, gear wheels, w w', rack, N, and pin, v, the whole being arranged and operating substantially as and for the purpose herein specified.

60,703.—DEVICE FOR CLOSING DOORS, GATES, ETC.—Levi S. Deming, Newington, Conn.

I claim the employment of the lever segment weight, h f g, in combination with the pulley, e, cord, n, substantially as and for the purpose described.

60,704.—SPINDLES AND BOLSTERS FOR SPINNING MACHINES. George Draper, Milford, Mass.

I claim the arrangement of the helical groove in the upright spindle when the groove is used in combination with the covered cup or closed oil chamber applied to the spindle and bolster, and formed in the sleeve, D, as set forth.

I also claim the combination as well as the arrangement of both of the annular grooves, d e, with the helical groove, c, formed in the spindle and to operate in the bolster and extend up from the oil cup, a, thereof, substantially as and for the purpose specified.

I also claim the arrangement of both the grooves, c and d, in the spindle, when they are used in connection with an oil cup applied to the spindle or arranged in the bolster, as specified.

60,705.—SAFETY ATTACHMENT TO CARRIAGES.—Claude Ducrux, New York City.

First, I claim the combination of a detaching apparatus with the brakes of a vehicle, substantially as herein shown and described.

Second, I claim the combination of the pins, c, with the oscillating crossbar, D, substantially as and for the purpose herein shown and described.

Third, The manner of securing the pins, c, to the swinging crossbar, D, by means of plates, d, substantially as and for the purpose herein shown and described.

Fourth, I claim the combination of the brake draw rod, O, and the strap rods, F G or I, with the oscillating cross bar D, substantially as and for the purpose herein shown and described.

Fifth, The combination of the lever, H, with the cross bar, D, pins, c, and sliding bars, E F G, substantially as and for the purpose herein shown and described.

Sixth, The combination of the sliding bar, I, with the tongue, S, and the os-

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cillating lever, D, substantially as and for the purpose herein shown and described.

Seventh, The bars, F and G, and upright arms, g g h h, or the bar, I, and arms, I I, combined and operating substantially as and for the purpose herein shown and described.

Eighth, The manner of operating the sliding bars, E, by means of slotted upright arms, e, and pins, f, substantially as herein shown and described.

Ninth, The combination of the spring fastening, i, with the swinging bar, D, substantially as and for the purpose herein shown and described.

Tenth, The construction of the disengaging apparatus, substantially as herein shown and described, so that by the movement of the lever, the braces and all the harness straps are simultaneously released, as set forth.

Eleventh, The construction of the brakes, M, substantially as described, so as to act upon the hubs of the wheels, as set forth.

60,706.—FIRE GRATE FOR STEAM BOILERS.—R. Eaton, Lee, England.

First, I claim the improved fire grate for wood or peat, formed of broad grate bars, placed one above another in steps or terraces, with their edges or sides over and under lapping each other, directing the passage of air into the fire laterally between them, and to prevent the dropping of hot coals into the ash pan, constructed and arranged substantially as herein describe d.

Second, I claim the combination of the broad grate bars, A A A, with the levers, b b and d, connected by the rods, e e, to open and close the air passages, a a a, between the grate bars, as described, substantially arranged as herein described.

Third, I claim the wire gauze or perforated plate guard, h, in combination with the dampers, i i, and the ash pan, C, constructed and arranged substantially as and for the purposes herein described.

Fourth, I claim the air pipe, k, in combination with the grates, A A A, arranged substantially in the manner and for the purposes herein described.

60,707.—BOOTS AND SHOES.—M. Evans, Russiaville, Ind.

I claim in gaiter boots, provided with flaps, B B, formed with an extension of the quarter and a fold connecting them, so as to make the boot water tight to its top, the double row of buttons, D E, and ornamental guard, C, the latter serving to conceal the ends of the flaps, and having straps, C' C' C' C', to take over the buttons, D E, as and for the purposes specified.

60,708.—ROOFING AND SIDING FOR HOUSES.—C. J. Fay, Hammonton, N. J.

I claim the use of and the manner of applying paper for roofing and clapboarding, substantially as described.

60,709.—CYLINDRICAL AMALGAMATOR.—Thomas M. Fell, New York City.

First, I claim the introduction of the alternating sluice or flood motion for obtaining entire suspension and trituration of the mass, accomplished by what we designate a dash or sluice board, acting in connection with a vibrating or oscillating cylinder, substantially as above set forth, for the purpose of amalgamation of gold and silver ores.

Second, I claim the introduction, for the purpose of amalgamation, of an oscillating or vibrating cylinder, to which I attach my dash or sluice board, all substantially in the manner herein described.

60,710.—PAPER FILE.—Josef Fleischl, New York City.

I claim a paper file, provided with a segmental clamp, b, and with spring clamps, d e, which act in combination with the bars, a c, substantially in the manner set forth.

60,711.—BURGLAR ALARM.—Robert G. Fowler, Olney, Ill.

I claim the arrangement of the wire, C d, mandrel, B, notched casing, A a, substantially as described and represented.

60,712.—HOLLOW RING.—Kasson Frazer, Syracuse, N. Y.

I claim a hollow metal ring, composed of two parts, held together by a self-sustaining lap joint, substantially as and for the purposes herein specified.

60,713.—MACHINE BELTING.—William H. Gates, Louisville, Ky.

I claim, First, A round belt composed of a non-elastic central cord, coated with vulcanized rubber or other elastic material, substantially as described and for the purpose set forth.

Second, I claim the combination of two or more twisted cords, coated with or surrounded by a coating of vulcanized rubber or other elastic material, to form an improved driving belt for machinery.

Third, I claim the process of coating a cotton or other cord as the base of a round belt, with vulcanized rubber or other elastic material, substantially as described and for the purpose set forth.

60,714.—STREET-CAR HEATER.—John Gibson, Jr., Albany, N. Y.

First, I claim the stove, C, arranged within the space betweeen the seat and the bottom of the car, A, and provided with the ash box, b, beneath it, substantially as herein set forth.

Second, The perforated protecting plate, D, on the front side of the seat, at the point where the stove is placed, substantially as and for the purpose specified.

Third, The combination of the ash pan, b, draft doors, m m, and pinch screw, p, when arranged as herein shown and described and for the purpose specified.

60,715.—ROOT EXTRACTOR.—Bernard Goodrich, Brentwood, N. H.

I claim the bush or root extractor, made substantially as described, viz., of the duplex-pronged share, the beam, and handles, arranged and for use as specified.

60,716.—PRESERVING HOUSE.—John C. Gove, Cleveland, Ohio.

First, I claim the ice chambers or boxes, C C, arranged above the preserving room, E, and below the receptacle, B, said boxes being separated from each other and the sides of the house by air chambers, D D, and being provided with doors at their ends and outside of the house, as and for the purpose herein specified.

Second, The arrangement of the fruit house, A, with a room, E, for preserving fruit, etc., with ice boxes, C C, chamber or receptacle, B, and air spaces, D D, the preserving room and ice chambers being provided with doors which are separate and distinct, and opening into each from the outside of the house, as and for the purpose specified.

60,717.—PRINTING PRESS.—Frederick J. Grace, Fort Lee, N. J.

First, I claim the impression roller, p, mounted upon springs, in combination with the levers, u u, for moving the roller, p, back, to prevent the paper being moved, as set forth.

Second, I claim the adjustable shear, r s, in combination with the actuating lever, u, and pins and cams, x and v', as and for the purposes specified.

60,718.—MACHINE FOR MANUFACTURING CANDLES.—Harrison Grambo, Philadelphia, Pa.

First, I claim the receiving and reducing mills, B C C', supply chambers, L' L' M Q, pistons, L L, plungers, N S, and molds, R, all combined and arranged substantially as and for the purpose specified.

Second, I claim the pistons, S', operating in combination with the plunger, S, and molds, R, substantially in the manner and for the purpose set forth.

Third, I claim the combination with the plunger, S, and pistons, S', of the wick tubes, a, arranged and operating substantially as described.

Fourth, I claim the clamps, d d, arranged and operating substantially as and for the purpose set forth.

Fifth, I claim the receiving and discharging tubes, Y', when arranged and employed in the manner and for the purpose set forth.

Sixth, I claim the combination with the tubes, Y', of the stationary pistons, Y2, arranged and operating in the manner and for the purpose specified.

Seventh, I claim the box, Y, affording a bearing and inclosing case for the tubes, Y', and reciprocated therewith by the means and for the purpose described.

Eighth, I claim the arms or rails, h2 h2, and levers, h h, arranged and operating substantially as and for the purpose specified.

Ninth, I claim the endless band, g, arranged and operating in the manner and for the purpose set forth.

Tenth, I claim the combination with the reducing mills or chambers, B B, of the steam chests or jackets, B' B', substantially as described.

Eleventh, I claim the knife, W, when operated in the manner specified, and employed in connection with the clamps, d d, for the purpose set forth.

Twelfth, I claim the combination of the dog, U, with the reels, T T, for limiting the let-off motion, as described.

Thirteenth, I claim the within-described candle-making apparatus, consisting of the receiving mills or chambers, B B, supplying chambers, L' M Q, plungers and pistons, N S S' L L, wick tubes, a, reels, T T, and clamps, d d, all arranged and operating substantially as set forth.

60,719.—WEAR PLATES FOR THE SOLES AND HEELS OF BOOTS AND SHOES.—John Gray, East Aurora, N. Y.

I claim the web or flange, d, provided with a continuous series of perforations, in combination with the corresponding guide marks of the rim, c, constructed and arranged substantially as and for the purposes set forth.

60,720.—SAFETY POCKET.—George Hamel, Abington, Pa. Antedated December 30, 1866.

I claim a box of any suitable shape and size with spring lid, fastened by seam or otherwise to the bottom of any pocket, for the purpose hereinabove described.

60,721.—PLOW CARRIAGE.—James M. Hammitt and Henry T. Miller, Toledo, Iowa.

We claim a plow carriage, having bar, D, spring, G, lever, E, swing, F, swinging lever, H, ratchet, K, pawl, L, and handle and spring, M, adjusted, combined, and arranged substantially as herein specified.

60,722.—CULTIVATOR.—A. P. Hammon, J. H. Lincoln, S. Lincoln, and T. W. Hammon, Montfort, Wis.

First, We claim the pivoting of the draft pole, D, to the frame, A, and the connecting of the rear end of the former to treadles, I I, substantially as and for the purpose set forth.

Second, The connecting of the plow standards of the two beams, J J, in the manner shown, or in any equivalent way, so that when the plows of one beam are moved or shoved backward, those of the opposite beam will be moved forward, and vice versa, for the purpose specified.

60,723.—MAKING STEEL-HEADED RAILS.—L. M. Hart, Philadelphia, Pa.

I claim a faggot for making a steel-capped railroad rail, composed of the corrugated steel bar, A, and iron bar, B, arranged and piled with the other parts, in the manner shown and described.

60,724.—GRINDING MILL.—Michael W. Helton and James H. Redfield, Bloomington, Ind.

We claim the horizontal and vertical shafts, G and D, with the worm and worm wheel, E and d, the springs, I and J, and the bell, K, when arranged and combined substantially as herein described and for the purposes set forth.

60,725.—SAW MILL.—Webster Herrick, Northampton, Mass.

I claim a saw mill carriage roller with tapering journals, substantially as herein shown and described.

60,726.—MACHINE FOR EMBOSSING CONSECUTIVE NUMBERS.—Louis Heuser, Boston, Mass.

I claim the combination of a series of slides, each made up of two pieces, f and i, when provided with male and female dies, and are all arranged to be operated at the same time by the plunger, m, for the purpose set forth.

Also, guiding and controling the position and movement of the pieces, i, with reference to the pieces, f, by means of the guides, h, and springs, j, as described.

Also, The combination of the inclined bed and wedges, e, with the compound slides, i f, and plunger, m, for the purpose of graduating the amount of impression to be given by descent of the plunger.

And in combination with the compound slides, i f, the means described, by which the plunger is made to descend only at the will of the operator while the driving shaft is kept constantly in motion.

60,727.—WINDOW LATCH.—Ernst F. Hofmann, Poughkeepsie, N. Y.

I claim the stop, c, in combination with the catch, D, spring, b, and latch, A, constructed and operating substantially as and for the purpose set forth.

60,728.—MACHINE FOR SPINNING, TWISTING, AND REELING.—George Hoover and A. N. Hadley, Richmond, Ind.

We claim the arrangement and combination of the mechanical devices herein set forth and described for producing a spinning, twisting and reeling machine, substantially as set forth and for the purposes described.

60,729.—SAD STONE.—H. W. Hopkins. Milford, N. H.

I claim a reversible sad stone, consisting of the body, A, having plates, C, at both ends, provided with shoulders, b, the rear one having a projection thereon adapted to fit in a corresponding recess in the lower end of the handle, B, which is pivoted to the projections, and operating in the manner described for the purposes specified.

60,730.—PEAT MACHINE.—Bennett Hotchkiss, New Haven, Conn., assignor to himself and Charles Monson.

First, I claim the use, in a machine for preparing peat or other plastic material, of the grinding surfaces, A A', having unequal rates of surface motion, co-operating in the manner described, to effect disintegrating the material, expressing the surplus water, and taking up the product upon the grinding surface having the faster rate of movement, substantially as set forth.

Second, The combination in such machine of the following instrumentalities: The cylinders, A A', or equivalent grinding surfaces, having unequal rates of surface motion, and the scraper, E, substantially as described for the purposes specified.

Third, The combination in such machine of the following instrumentalities: the said grinding surfaces, A A', having unequal rates of surface motion, the scraper, E, and the receiving and conducting trough, F, substantially as described for the purposes specified.

Fourth, The combination in such machine of the following instrumentalities: the said grinding surfaces, A A', having unequal rates of surface motion, and the apron, D, or other equivalent device, for receiving and conducting away the surplus water expressed by the cylinders, substantially as set forth.

Fifth, Combining in such machine grinding surfaces operating as described, with an apparatus for moulding the peat or other plastic material, the combination being substantially as specified.

Sixth, Constructing the cylinder, H, with molding boxes and pistons, substantially as described, and operating the same in combination with the cam presser, G, substantially as set forth.

60,731.—LADDER.—F. W. Hovey, Boston, Mass.

First, I claim the combination of the bar, D, and pivoted steps, C, wheel, B, and sides, A, of the ladder, with each other, substantially as herein shown and described.

Second, The combination of the notched arm, E, with the steps, C, and bar, D, of the ladder, substantially as herein shown and described.

Third, The combination of the bar, D, and the removable pivoted steps, C, with the rounds and sides of the ladder, substantially as herein shown and described.

Fourth, The combination of the slotted bar, F, and pin, f, with the bar, D, and steps, C, of the ladder, substantially as herein shown and described.

60,732.—HOT-WATER HEATING APPARATUS.—Henry Howard, Springfield, Mass., assignor to himself and Richard F. Hawkins.

First, I claim the arrangement of a number of boilers, one above another, in such a manner as to form flues by their sides, and having tubular bars connecting them, substantially in the manner and for the purpose set forth.

Second, The combination with a boiler, by means of a flexible pipe, of a hollow vessel, arranged and operating for the purpose of regulating the fire, substantially as described.

Third, The radiators formed as described, having one part, R, larger than the other part, S, substantially as herein set forth.

60,733.—TOBACCO PIPE.—Edwin Hoyt, Stamford, Conn.

First, I claim the nicotine and saliva cup, C, in combination with the bowl of a tobacco pipe, constructed and arranged substantially as herein specified.

Second, The socket, D, provided with a neck, d, in combination with the cup, C, bowl, A, and stem, B, substantially as and for the purposes herein specified.

Third, The combination of the cup, C, bowl, A, cap or bulb, c, socket, D, and stem, B, substantially as herein shown and described.

60,734.—HEATING STOVE.—Z. Hussey, Wilmington, Ill.

I claim a heating stove, constructed with a laterally-flattened and curved internal flue or pipe, G, opening upwards through the top, H, and downwards through the side of the stove, and having a draft opening, D, below, and a regulating damper, E, above the fire, said several parts being constructed and arranged for use, substantially as and for the purpose set forth.

60,735.—WINDOW-SASH FASTENING.—Robert Hutton, Brooklyn, N. Y.

I claim a window-sash fastening, composed of a socket, C, provided with a friction roller, E, or its equivalent, and a wedge or key, D, applied to a window frame, and in such a relative position with the sash B, as to operate in the manner substantially as and for the purpose herein set forth.

60,736.—BLIND.—Robert Hutton (assignor to himself and William Mee), Williamsburg, N. Y.

I claim a blind, having its rod for operating the slats of the same hung to one end of such slats, substantially as and for the purpose described.

60,737.—COMBINED SEAT AND TOP FOR CARRIAGES.—Freegift Jackson, Sparta, Ohio.

First, I claim attaching a carriage top to a supplementary seat, B, which may be placed above a permanent seat, A, or removed, so as to form a covered or uncovered seat, substantially as described.

Second, Connecting the frame supporting the carriage top with the permanent seat, A, by means of slides and grooves, so as to permit the frame and top to be removed or attached by a single movement, substantially in the manner set forth.

60,738.—SLOP JAR.—John C. Jewett, Buffalo, N. Y.

I claim a slop jar provided with the annular water recess formed between the sides, f f, and rim, C, submerged flange, e e, and central odor trap and the concave cover, B, constructed and arranged substantially as and for the purposes set forth.

60,739.—QUARTZ MILLS.—G. D. Jones, New York City.

I claim the adjustable or rising and falling scrapers, M, and the fixed scrapers, G, arranged and applied to operate substantially in the manner as and for the purpose set forth.

60,740.—TIME GLOBE.—Louis P. Juvet, Glen's Falls, N. Y.

First, Making the axis of the daily wheel, e, of a chronometer, applied to revolve a hollow globe, and located in its interior, coincident with the axis of said globe, in the manner substantially as shown and described and for the purpose set forth.

Second, Winding the said chronometer from the outside of the globe, without the use of a key, by means of the thumb-piece, T, and sleeve, b, and its connections, in the manner substantially as shown and described and for the purpose set forth.

Third, The combination of the solid axis, a a', with the sleeves, b and d d', the former, b, by which to wind up the works from the outside, and the latter, d d', by which to transmit the proper motion to the globe, said parts being constructed, arranged and operating in the manner substantially as shown and described and for the purpose set forth.

60,741.—CAR COUPLING.—John Kelley, Woodberry, Md.

I claim the wrought-iron hook, A, provided with a prong, C, arranged to act upon the coupling as described.

60,742.—CLAMP FOR HOLDING SMOKING PIPES FOR FINISHING.—William Kerr, Jr., Boston, Mass.

I claim the combination with the thumb nuts and enlarged recesses formed in the face plate of springs, arranged and operating substantially as shown and set forth.

60,743.—LUNCH-HEATING APPARATUS.—H. M. Kinsley, Chicago, Ill.

I claim the combination of a chamber, B, for containing alcohol, or its equivalent, with a preserving can, A, substantially as and for the purpose herein specified.

I also claim the combination of a burning cup or dish, C, with a chamber, B, for containing alcohol, or its equivalent, and a preserving can, A, substantially as and for the purpose herein specified.

60,744.—KEYBOARD OF MUSICAL INSTRUMENT.—G. B. Kirkham, New York City.

First, I claim the levers, k' k', in combination with the manual keys, z z, etc., and their common support, l, acting on the levers, i i, substantially as and for the purpose set forth.

Second, I claim the combination of the arm, d, the lever, e, with its adjusting screw, g, and slots, f f, as described, and for the purpose set forth.

60,745.—ANVIL.—Lancelot Kirkup, Brooklyn, N. Y, assignor to himself, Albert Palmer, Joel Packer, and W. M. Hudson.

I claim the anvil, constructed substantially as shown, for the purposes specified.

60,746.—TWEERS.—Evan Koons, Funkstown, Md., assignor to Elias Emmert, Washington county, Md.

First, I claim, in combination with blast openings in the bed of a forge or furnace, the above-described swinging valve or plug, constructed and operated substantially as set forth.

Second, I claim the combination of the cap, E, rod, D, and hinged valve or plug, C, constructed substantially as specified.

60,747.—APPARATUS FOR FILTERING AND REFINING OIL.—M. H. Kruger, New York City.

I claim the movable filters, B, suspended from rods, a, within the steam box, A, for the purpose described, substantially as specified.

60,748.—SLIDE VALVE.—J. J. Lahaye and S. T. Reeves, Reading, Pa.

We claim the arrangement of the valve, B, with its recess, containing an elastic packing material, and the plate, D, with its rib, e, substantially as and for the purpose described.

60,749.—LEAK SIGNAL FOR VESSELS.—Noyes D. Lamb, Norwich, Conn.

I claim, in combination with a lever, i, hinged or pivoted to the frame or case, and to the stem of the float, the arranging of the bent arm, h, escapement, g, and bell hammer, m, all upon one and the same shaft, by which means I very much cheapen and simplify the construction, and render its action more certain by dispensing with parts that are liable to become disarranged, all substantially as described and represented.

60,750.—MAKING JUG TOPS.—Geo. P. Lang and Peter Lauster, Alleghany, Pa.

First, We claim making jug tops of thin sheet metal, consisting of a body section, a, lid, b, button, e, hinge piece, c, and ring, d, cut, shaped, and joined, substantially in the manner hereinbefore described.

Second, The construction, from thin sheet metal, of the main or body section, a, of a jug top, when the spout, n, forms a part of such section, substantially as and for the purpose above described.

60,751.—LATHE DOG.—Chas. W. Le Count, Norwalk, Conn.

I claim the hollow dog or carrier, constructed in the manner substantially as and for the purposes set forth.

60,752.—WHEELWRIGHT'S SPOKE-DRIVING BENCH.—F. M. Lemmon, Shelbyville, Ill.

I claim the bench, B, clamping rod, D, adjustable rest, C c, and holding rod and lever, G E, all arranged and operating as and for the purpose herein set forth.

60,753.—COMPOUND FOR SALINE MEDICATED BATHS.—Chas. Lennig, Philadelphia, Pa.

I claim the composition of matter called "strumatic salts," put up in the form and packages as above named, substantially as above set forth.

60,754.—APPARATUS FOR PREPARING COTTON.—Chas. Lewandowski (assignor to himself and Emile Grainer), Paris, France.

I claim, in combination with the double combing and beating cylinders, and the single air duct, for separating and classifying the fibers, the double delivering mechanism for separately discharging the thus separated and classified fibers in laps or slivers, the whole operating in the manner substantially as and for the purpose described.

60,755.—COMPOSITION OF MATTER FOR FUEL AND OTHER PURPOSES.—John S. Lipps, Brooklyn, N. Y., assignor to himself and Edwin Sanderson, New York City.

I claim the composition of matter, substantially as herein described, and composed of coal coke or charcoal dust admixed with dextrine and powdered pitch and baked, essentially as herein set forth.

60,756.—FASTENING FOR RAILROAD RAILS.—Horace T. Love, Vermillion City, Kansas.

I claim such an inclination of the under surface of a screw head, truncated in its relation to the gage of the thread of the screw, as to necessitate a bearing of that surface upon the flange of the rail so as to make the rail tight when screwed down, and the rail released by a reverse operation of the screw, the truncation being tangential to the shank of the screw, in the manner and for the purpose herein described.

60,757.—DEODORIZING PETROLEUM.—Orazio Lugo, New York City.

I claim the use of chromic acid and hypochlorite of soda, or their equivalent, for the purpose of deodorizing offensive smelling kinds of petroleum.

60,758.—DEVICE FOR SUSPENDING HORSE HAY FORKS, ETC.—Geo. B. and Clark Lewis, Adams Center, N. Y.

First, We claim a clutch for suspending horse hay forks, etc., consisting of the movable and adjustable bars, A A, pivoted together and having penetrative points, G G, substantially as described and for the purpose set forth.

Second, In combination with the above, the crotched bolt, B, handle nut, C, and bolt, H, applied and operating, substantially as and for the purpose specified.

Third, The sliding or movable ring, F, in combination with the adjustable clutch, A A, as and for the purpose specified.

60,759.—CONCENTRATING SULPHURIC ACID.—Joseph D. Lofters, Chelsea, Mass.

I claim, in the process of concentration or distillation of sulphuric acid, the employment of iron vessels or tanks, substantially as set forth.

60,760.—DEVICE FOR VENTILATING AND HEATING ROOMS.—James H. Loomis, Attica, N. Y.

I claim the pipes, G H, in combination with the stove-pipe heater, B, constructed as described, for conveying cold air from and returning warm air to another apartment, arranged and operating substantially as set forth.

I also claim constructing the heater, B, with the diaphragm, f, provided with annular perforations, i i, around the flues, d, substantially in the manner and for the purpose described.

I also claim the damper, n o, in combination with the drum heater, B, air induction pipe, G, and stove, A, arranged and operating, substantially as and for the purposes set forth.

60,761.—WRINGER FOR CLOTHES AND MOPS.—C. E. Gage, Fond du Lac, Wis.

I claim the frame composed of the slotted slide bars, A A, foot piece, D, with roller, D2, in combination with the frame, C, carrying roller, E, when arranged together, substantially in the manner and for the purpose described.

60,762.—TEMPERING STEEL SPRINGS.—Cephas Manning, West Albany, N. Y.

I claim the use of the combination of linseed oil, raw or boiled, with as much common salt as the oil will take up, in the manner and for the purpose specified.

60,763.—MACHINERY FOR PUNCHING STEEL-PEN BLANKS.—Edward A. Marsh and Jarvis P. Kelly, Chicopee, Mass.

We claim, in combination with the die, reciprocating punch, stripper, and carriage, the jaws, t, when arranged to clamp or grasp the plate at the center line thereof, and draw it progressively and intermittently to the action of the punch, substantially as set forth.

We also claim, in combination, the subjects of the first claim, the guides, w and x, and guide rolls, y and z, arranged to operate substantially as set forth.

We also claim the arrangement of mechanism for tripping or disengaging the series of ratchet pawls, substantially as described.

60,764.—MACHINE FOR CUTTING FLY NETS.—Henry D. Martin, Ypsilanti, Mich.

I claim the combination of the bar knives and springs, D D, and the cam roller, C C, substantially in the manner and for the purpose set forth in this specification.

60,765.—SLEIGH.—Wm. M. C. Mathews, Summer Hill, Pa.

First, I claim pivoting the bolsters of a bob sleigh to the bobs, substantially as herein shown and described.

Second, The combination of the bars, F, iron bar, N, and bar or plank, L, with each other, and with the beams, E, and bolsters, G, of the forward bob of the sleigh, substantially as herein shown and described.

Third, The combination of the bars, F, and iron bar, N, with each other and with the beams, E, and bolster, H, of the rear bob of the sleigh, substantially as herein shown and described.

60,766.—WATER WHEEL.—George W. McCann, Springfield, Ohio.

I claim, First, The wheel, D, with two or more series of buckets, substantially as described, in combination with the independent gates, H H', for the purpose set forth.

Second, In combination with the gates, H H', the springs, N N substantially as and for the purpose set forth.

60,767.—BREAST PADS.—Anne S. McLean and James P. McLean, Brooklyn, N. Y. Antedated Dec. 12, 1866.

We claim a pad having a mat, A, and cushion, N, combined therein, whether with or without a spring or springs, all substantially as described.

60,768.—CANE STRIPPER.—M. Mellinger, Dayton, Ohio.

I claim the shoulders, i, in stationary blade, D, and spring blades, E, operating in combination with the slotted spring blades, G, as and for the purpose specified.

69,769.—FEED MECHANISM FOR SEWING MACHINES.—M. H. Merriam, Charlestown, Mass.

First, I claim the eccentric and its motor, the crank, link and their motor, when combined and arranged with a feeding device, so as to operate it, substantially as described.

Second, I claim a feeding device for sewing machines, in which a reciprocating shuttle moves at right angles, or nearly so, to the path of the vibrating feeding movements of the feeding device, when constructed substantially as set forth, and arranged to operate as specified.

60,770.—METHOD OF MAKING SHEET METAL VESSELS OF TWO THICKNESSES.—Philip P. Meyer, New York City.

I claim, First, The process described for forming a vessel of two or more metals by spinning them, one upon the other, for the purpose set forth.

Second, The combination with a vessel constructed of two or more metals spun together as set forth, of strengthening bars or rings, substantially as as herein set forth.

60,771.—APPARATUS FOR STEERING VESSELS BY STEAM.—William J. Miller, of the Borough of McKeesport, Pa.

First, I claim the combination of the levers, p and v, and the cut-off lever,

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h, of the nigger engine with the steering wheel, d, and the gear wheels, n n' o and o', connecting it with the engine, constructed and arranged substantially as and for the purposes hereinbefore described.

Second, Also, the check lever, t, operated by means of stops or buttons on the tiller rope, in combination with the cut-off lever of the steam engine. constructed and operating substantially as hereinbefore described for the purpose of stopping the steering engine when the tiller is turned to its utmost limit in either direction.

60,772.—Toy Wind Wheel.—Max Miller, Brooklyn, N. Y.

I claim an improved toy wind mill formed by the combination of the mouth piece, A, air tube, B, air chamber, C, pivoting post, D, and revolving wheel, E, or equivalent, with each other, substantially as herein described, as a new article of manufacture.

60,773.—Hay Elevator.—M. Mitchell, Crown Point, Ind.

I claim, First, The shaft, D, lever, E, provided with the friction roller, a, in combination with the lever, F, and rope, R, for the purposes and substantially as described.

Second, I claim the side pieces or frame, A, and posts, B, in combination with the levers, E and F, and shaft, D, substantially as herein described.

60,774.—Excavator.—James Molyneux (assignor to the Bordentown Machine Co.), Bordentown, N. J.

I claim, First, A frame, H, carrying an endless chain of buckets, and hung to a frame capable of being turned on a platform or truck, all substantially as described, for the purpose specified.

Second, The bucket frame, H, hung to a bolt or shaft, arranged to slide in slots in the frame, and controlled by screw rods, N and N', or their equivalents, substantially as and for the purpose herein set forth.

Third, The combination of the tubular shaft, G, chain pulley, I, driving pulley or wheel, e, bolt, F, and slotted plates, E and E'.

Fourth, The combination of the tubular shaft, G, its nuts, l, and the screw rods, N and N'.

Fifth, The frame work carrying the bucket frame, H, and endless chain of buckets, in comb nation with the truck, P, on which the said frame work turns, and the platform, R, on which the truck and the entire machine are arranged to traverse, all substantially as described.

60,775.—Smoothing Iron.—Thomas C. Moore, Wilmington, Ohio.

I claim the pin, a, with its projections, c c, on the body, A, of the flat-iron, in combination with the hole and its side notches, d d, in the handle, B, substantially as and for the purpose herein specified.

I also claim the heel projections, g g, in combination with the device for coupling the handle, B, to the body, A, for the purpose set forth.

60,776.—Rotary Harrow.—David Morris, Bartlett, Ohio.

I claim the rotary harrow, having a bent post, upon which a spade wheel is so journaled that the spades, by contact with the soil, shall arrest the spokes and rotate the harrow without the intervention of gearing, substantially as described.

60,777.—Stovepipe Thimble.—Thomas Newell, Oskaloosa, Iowa.

I claim the quadrilateral-shaped stone, A, with two shoulders, a a, for resting it upon cleats between the joists, and annular dovetailed grooved ring, B, constructed as described, of one piece of stone, as and for the purposes set forth.

60,778.—Thrashing Machine.—Nelson Palmer, Hudson, N. Y., assignor to himself and T. G. Palmer, Schultzville, N. Y.

First, I claim arming a threshing cylinder with teeth, which have their opposite faces rough and smooth, as and for the purpose specified.

Second, I claim making the teeth in the cylinder and concave, cone-shaped, or pyramidal, so that by adjusting the concave nearer the cylinder, the surfaces of the teeth shall approach nearer to each other.

Third, I claim such a construction and arrangement of threshing machines, having two concaves, as described, that by the rotation of the threshing cylinder in one direction, the smooth faces of the teeth are caused to act in concert with the smooth faces of the teeth in one concave, and by reversing the rotation of the cylinder, the rough faces of the teeth are caused to act in concert with the rough faces of the teeth in the other concave.

60,779.—Broom Hanger.—James L. Patterson, Wheeler Station, Ind.

I claim the ring, A, in combination with a bail or hook, B, arranged and operating substantially as and for the purposes set forth.

60,780.—Manufacture of Sulphate of Alumina, Alum, and other Aluminous Compounds.—Henry Pemberton, Allegheny City, Penn.

I claim the employment, in the manufacture of sulphate of alumina, alum, and other aluminous compounds, of the acid solution obtained from the tarry acid residuum of the treatment for the purpose of refining of petroleum, coal oils, and other hydrocarburets.

60,781.—Process for Finishing Sheet Metal.—Charles H. Perkins, Providence, R. I.

First, I claim the process herein described of annealing and imparting a blue color to sheet-metal plates consisting in subjecting such plates which have been previously suitably cleaned and brightened to the action of heat applied while the plates are inclosed in a close flask, the plates being so arranged within the flask that their surfaces shall be surrounded by a free air space, substantially as set forth.

Second, The process herein described of finishing sheet-iron plates by first coloring the same in the manner above set forth, and, secondly, in subjecting the plates after being colored to the action of pressure rollers, or equivalent means for producing a dense and lustrous surface, substantially as described.

60,782.—Spring Bed.—George H. Pool, New York City. Antedated Dec. 19, 1866.

I claim the rails, c c, resting on the springs, d d' and f f', and attached thereto by means of the pins, h h', passing through the slots, g g', said springs being made of greater or less elasticity by varying their length or the angle at which they are inserted in a and a', or by both of these means, as described and arranged.

60,783.—Faggots for Railroad Rails.—Samuel L. Potter, Wyandotte, Mich.

I claim a pile or faggot for rolling railroad bars constituted of iron and steel bars arranged substantially as herein represented and described.

60,784.—Spring Crupper.—Edward Powell, Conneautville, Pa. Antedated Dec. 29, 1866.

I claim the metal frame, A A, in combination with the spiral spring, B B, and tail supporter, C C, substantially as described.

60,785.—Carpet Sweeper.—George Purrington, Jr., New York City, and James H. Purrington, Mattapoissett, Mass.

I claim the adjustable axles or bearings, K, constructed and arranged substantially as herein described in combination with the drive wheels, J, and frame, A, of the sweepers, as and for the purpose herein set forth.

60,786.—Spring Fishhook.—Elias Rhodes, Jr., and J. W. Rhodes, Clyde, Ohio.

We claim the hook and rods, A B, having swell, D, and contraction, C, in combination with the ways, F F, stationary head, E, cross head, G, spiral spring, H, as and for the purpose substantially as specified.

60,787.—Planing Machine.—Seneca M. Richardson, Worcester, Mass.

I claim, in a tonguing and grooving or other machine, the combination with the cutter head of an adjustable mouth piece or presser bar, attached to the bed piece of the machine so that while separate and distinct from the cutter head it may be capable of moving concentrically therewith, the whole being constructed and arranged for operation substantially as shown and described.

60,788.—Level.—W. L. Richardson, Reading, Mass., assignor to himself and F. E. Nutting, Florence, Mass.

First, I claim a ball joint having the plummet line attached to the center of the ball, substantially as and for the purpose described.

Second, The stud, H, having the grooves, c d e, arranged with the set screw, b, substantially as and for the purpose described.

Third, The tube, S, mounted upon the frame, L, and having the reversible level, M, arranged as described and being detachable from the rest of the instrument so that it can be used as a mason's level and plumb, substantially as described.

60,789.—Grinding Mill.—J. C. Roberts, Adamstown, Md.

I claim, in combination with a governor operated from the mill gear, a regulating mechanism operated through the intervention of a screw shaft, a traveling poise, and scale beam, that will change and adapt both the feed, and the set of the stones to the varying speed of the runner caused by changes in the motive power and thus produce a uniform grade of flour or meal, substantially as described.

60,790.—Mop Wringer.—A. J. Robinson, Troy, N. Y.

I claim an improved mop wringer formed by the combination of the bar, B, and wringer, C, constructed with a circular rim, c2, two or more descending spiral arms, c3, lower central part, c4, and tenon, c1, substantially as herein described and for the purpose set forth.

60,791.—Safety Nipple for Fire-arms.—William N. Rowe, Washington, D. C.

I claim, in combination with the nipple of a fire-arm, a cylinder shield or cap that can turn thereon, and having an opening through it, that in one of its positions closes, and in its other position discloses the opening through or the powder in the nipple, and so that a cap may be exploded upon it in its closed position without firing the charge in the arm and fire it in its other disclosed position, substantially as described.

60,792.—Printers' Ink Roller.—G. Russell, New York City, and T. B. Hull, Brooklyn N. Y.

First, We claim the construction of a stock on which to cast or form printers' rollers for receiving or distributing ink in such a manner that the journals on which it turns may be removed and replaced at pleasure.

Second, We claim the use of a cylinder or tube as a stock for a printer's roller.

60,793.—Means for Rocking Cribs or Cradles.—John S. Ryan, Berlin, Wis.

I claim the combination of the platform, A, spring, B, wheels, C D, and crank wheel, E, arranged in connection with the shaft, G, arm, H, and adjustable rod, I, in the manner and for the purposes specified.

60,794.—Composition for Preparing and Hardening Wood and Preserving the Same.—John Lewis Samuels, San Francisco, Cal.

I claim the use of the above-mentioned composition of sulphate of iron, common lime and water, in about the above-mentioned proportions for the purpose of injecting wood and timber to render them impervious to the influence of wet and dry rot and the attacks of worms and insects.

60,795.—Boiler-flue Cleaner.—Bernard Scheafer, Chicago, Ill.

I claim the construction and arrangement of the springs, A A, with the disks, B B, plate, C, and guides, D D, as herein described and for the purpose set forth.

60,796.—Box for Transporting Small Fruit and Berries.—Eli Secor, Lawrence, Mich.

I claim a fruit box for the transportation and safe keeping of fruits or berries, constructed and arranged substantially as herein shown and described.

Second, I claim the tray, C, either separately or in combination, constructed and arranged substantially as herein shown and described and for the purposes specified.

60,797.—Apparatus for Mixing Sugar.—Martin L. Senderling, Jersey City, N. J.

I claim, First, The process, substantially as herein described, of mixing sugars through centrifugal force by means of a wheel receiving upon it sugars of different grades or qualities.

Second, The mixing wheel acting by centrifugal force constructed with vanes inclining on their faces upwardly in a backward direction in relation to the run of the wheel, essentially as specified.

Third, The combination with the centrifugal mixing wheel of a crushing mill arranged to deliver the crushed sugar directly upon said wheel, substantially as herein set forth.

Fourth, The combination of a divided hopper, crushing mill, and centrifugal mixing wheel, essentially as specified

60,798.—Gate.—J. W. Singleton, Quincy, Ill.

I claim the apparatus constructed and arranged substantially as herein described for the purpose of opening and closing gates and fastening and releasing them when either open or closed, as herein set forth.

60,799.—Caster for Furniture.—Francis Smith (assignor to Edward Ward Wilder), Boston, Mass.

I claim as my improvement the formation of the lower end of the leg, E, with the curved concavity, d, and the formation of the roller, C, and its arrangement with respect to such concavity and the shank, B, of the roller frame, A, substantially as set forth.

60,800.—Machine for Tenoning Blind Slats and Boring the Styles.—Hiram Smith and Thos. J. Lumis, Norwich, Conn.

We claim, First, The use of vibrating, centering cutters, d' d', in combination with circular saws, c c, the said cutters and saws being brought into action by means such as described, or the equivalent thereof, and operating substantially as described, for the purpose of forming tenons on slats.

Second, Constructing the tenon cutters, d' d', in such manner as to compress and taper the extreme outer end of the tenons on the slats, substantially as described.

Third, The combination of tubular longitudinal cutting and centering tenon cutters, d' d', with slat-rests, g g, which are constructed and arranged substantially as described.

Fourth, The combination of the shafts, C C', adjustable standards, D D, and E E, with the slat supports, H H, which are also adjustable, the said parts being brought into action by means such as described, or the equivalent thereof, substantially as described for the purpose set forth.

Fifth, The spring pin, n, applied to adjustable arms, m m', in combination with the style support, R, and boring tool, a2, substantially as described.

Sixth, Holding the slats by means of the tubular cutters, cutting the shoulders of the tenons with the saws, and then finishing the tenons by means of the same tubular cutters, which hold the slats while the saws are operating, all substantially in the manner herein described.

60,801.—Wrench.—R. S. Stenton, Brooklyn, N. Y.

I claim making the inclining jaws, A and B, at such an angle with the straight shank, C, as to embrace four sides, and to grasp in parallel contact three sides of a hexagon nut, in combination with a sufficient elongation of the lower jaw, so as to grasp two sides of a square nut as set forth.

60,802.—Means for Adjusting Spindles in Ring Spinning.—Francis A. Ferry, Canton, Mass.

I claim adjusting the spindle, E, by the bolster F, and the step, G, nuts, f g, and opening, O O, substantially in the manner and for the purposes herein set forth.

60,803.—Water Elevator for Railroad Tanks.—Charles L. Stevens, Galesburg, Ill.

I claim, First, The arrangement of the three levers, C C' C, constructed with friction rollers, f, on their ends, for operating the pumps by the depressing and elevating movement of the platform beams, b, resting directly thereon, and weights, E, connecting therewith substantially in the manner and for the purpose as set forth.

Second, I claim weather-tight planked rail platform, resting directly on the friction rollers, f, of the ends of the levers, C, substantially in the manner and for the purpose as set forth.

Third, I claim the platform beams, b, having shaft rods, constructed with friction rollers, c, on their ends, and operating in vertical openings, g, in the bed sills, D, and under the rails, substantially in the manner and for the purpose as set forth.

Fourth, The friction rollers, h, as arranged on the corners of the ends of the platform, to serve as lateral guides in the depressing and elevating movement of the platform substantially in the manner and for the purpose as set forth.

Fifth, The weights, E, as arranged in their connection with the levers, substantially in the manner and for the purpose as set forth.

Sixth, The side plates, a, on the sides of the rails, A, of the platform, substantially in the manner and for the purpose as set forth.

60,804.—Cut Off for Steam Engine.—Albert Stuckenrath, New York City.

I claim the lever, L, adjustable ring, R, constructed substantially as and for the purpose set forth, and shown in the accompanying drawings.

I also claim the combination of the pronged lever, L, adjustable ring, R, levers, u, and index of the graduated dial, D, substantially as set forth.

60,805.—Car Spring.—William Toshrach, New York City.

I claim a series of thin, elastic, rectangular metallic plates, either straight or curved, of graduated lengths, in combination with compensating rubber springs, and a suitable casing when so arranged as to be deflected if made straight, or straightened if used in a curved form, by means of flanged pressure plates, the whole constructed and operating substantially in the manner and for the purpose herein set forth.

60,806.—Liquid Measure.—Joseph Trent, Millerton, N. Y.

I claim the combination of the can, A, and the funnel, B, and the double jointed hinge, H, substantially as arranged and described.

60,807.—Channeling Machine.—Hervey S. Vrooman, Hoboken, N. J.

First, I claim so applying the arm, L, to the machine, that it may be removed from the frame or standards without withdrawing the pin, a, upon which it swings.

Second, Also the provision for longitudinal movement of the arm to adjust the cutters with reference to the edge guide wheels, substantially as set forth.

Third, Also, in combination with the arm, L the block N, or the auxiliary block, O, carrying the cutters, and made capable of vertical adjustment to simultaneously regulate the depth of cut of the knife, and grooved substantially as described.

Fourth, Also, the slotted construction of the knife stock, Q, in combination with a groover, stock, and other parts of a channeling machine, to permit its removal without withdrawing the screw, h, substantially as set forth.

Fifth, Also, in combination with the stock, Q, the gauze plate, P, for determining the position of the knife, when replaced substantially as described.

60,808.—Gate Hinge.—James T. Watson, Richmond, Ind.

I claim the combination and arrangement of the butt, A, bar or wing, B, bracket, C, and thumb-piece and screw-bolt, D, when constructed and operating as and for the purposes set forth.

60,809.—Mode of Lubricating Journals.—Isaac P. Wendell, Philadelphia, Pa.

I claim an oil box, A, having a tube, D, in combination with plate, B, having orifices b b, and journal, E, substantially as described.

60,810.—Lantern.—William Westlake, Brooklyn, N. Y.

I claim, First, converting the conductor's lantern into a signal lantern, by the means and substantially as herein recited.

Second, I claim accommodating the globe, or glass of the lantern, by means of the screw plate connected to the part, c, substantially as herein described.

Third, I claim the cap, h, above the plate, g, for preventing the escape of the oil as herein named.

60,811.—Ice Spur.—Martin V. B. White, Ballston, N. Y.

I claim the combination of the detachable and adjustable ice spur, A, with the metallic piece, B, or its equivalent, operating in the manner and for the purposes substantially as herein fully described and set forth.

60,812.—Planing Machine.—Baxter D. Whitney, Winchendon, Mass.

I claim having the size of the back pressure feed roll, or rolls, or the size of the gear wheels that drive them, such as will give the surface of the roll or rolls a trifle greater or less motion than the front feed rolls and lumber to be planed have, thus causing the back roll or rolls to slide a trifle on the planed surface, thereby preventing any substance from adhering and accumulating on the rolls.

60,813.—Threshing Machine.—Mark Wilder, East Princeton, Mass.

I claim, First, the combination of fan, D, with the separating parts of the machine substantially as and for the purposes stated.

Second, the combination of fan, C, with the threshing parts of the machine substantially as and for the purposes stated.

Third, The combination and arrangement of fans, C and D, with cylinder, B, substantially as set forth.

Fourth, The combination and arrangement of fans, C and D, and threshing cylinder, B, with frames, O and K, as and for the purposes set forth.

Fifth, The combination with the front of box, E, of the guards, o, and adjustable frame, p, substantially as and for the purposes set forth.

Sixth, Supporting bed piece, H, by means of hinged supports, I and J, for the purposes stated.

Seventh, The combination of the adjustable damper, R, with the fan D, substantially as and for the purposes set forth.

60,814.—Metallic Cartridge.—O. Winchester, New Haven, Conn.

I claim a cartridge case, consisting of the case, A, and cap, B, with the intervening disk or cushion, b, arranged to operate substantially as and for the purpose set forth.

60,815.—Car Coupling.—Emanuel Zorger, Greensburg, Ind.

I claim, First, the hinged gravitating catch, D, when constructed with the concavity, H, and chamfered faces, g g', and with the slot, f, and used in combination with a draw head, with converging throat, and V shaped pocket, I, and also in combination with the hinged bar, K, said parts being constructed substantially in the manner and employed for the purpose set forth.

Second, In combination with the draw bar, a, and draw head, A, constructed and arranged to act automatically, substantially as set forth, I claim the friction plates, N N', and tension springs, O P, for holding the draw head in any required position, when coupling the cars, substantially as set forth.

60,816.—Globe Valve for Steam Engine.—E. H. Ashcroft, Lynn, Mass.

First, I claim the hollow valve stem, D, constructed in the manner substantially as described, and for the purpose set forth.

Second, The combination of the said stem, with the globe valve, B, and screw nut, F.

60,817.—Boiler Gage-cock Handle.—E. H. Ashcroft, Lynn, Mass.

I claim a handle for gage or water cocks for steam boilers, constructed in the manner substantially as shown and described, and for the purpose set forth.

60,818.—Pump.—Stephen L. Avery, Norwich, N. Y.

I claim my improved pump, constructed of the sliding plate, g, compensating spring, x, metallic plunger or piston, d, and suitable valve and valve seats, j, arranged in combination with the tubing of a well, A, and operating substantially in the manner hereinbefore described.

60,819.—Method of Preparing Sole Leather for Boots and Shoes.—David M. Ayer, Lewiston, Me.

First, I claim the method herein described, of preparing sole leather for the construction of boots and shoes, with air cells between the outer and inner soles.

Second, I claim, as an article of manufacture and sale, sole leather corrugated or fluted, and hardened, substantially as described.

60,820.—Hillside Plow.—Frederick G. Bakes, Vevay, Ind.

First, I claim the provision in a hillside plow, of right and left wings, or mould boards, G G,' adapted to be alternately secured in the active and inactive positions, substantially as set forth.

Second, In the described combination with the reversible share, F, and wings, G G', I claim the latch, K, lips, P, lugs, L L', M M', eye, N, and hook, O, or their mechanical equivalents, for the purpose explained.

Third, The arrangement of duplicated wings, G G', pivoted near their front ends to the sheath, and secured alternatively to their upper or inactive positions by the hook, Q, and the eye, R, or their equivalents.

60,821.—Wool Press.—George Baldwin and Allen B. Chase (assignors to Allen B. Chase), Italy Hill, N. Y.

I claim the latches, D and D, rolling catch, E, provided with the weighted arm, G, and treadle, F, when constructed and arranged substantially as specified and used for the purpose set forth.

60,822.—Die for Cutting Screws.—E. D. Barrett (assignor to self and Julius B. Savage), New Haven, Conn.

I claim the combination of the lever, E, the wedge, I, cutter, c, and set screws, g and c, so as to operate substantially in the manner herein set forth.

60,824.—Powder for Facing Molds.—William Batty, Cincinnati, Ohio.

I claim the molder's facing powder, composed and prepared in the manner described.

60,825.—Corn Sheller.—Charles Beach, Penn Yan, N. Y.

First, I claim the adjustable ring, D, in combination with the shelling bed composed of the spring sections, b b, operating substantially in the manner and for the purpose herein specified.

Second, The combination of the inclined wings, a a, with the hopper, B, shelling bed, c, and cylinder or cone, E, arranged and operating as herein set forth.

Third, The combination of the curved arms, G G, with the perforated floor, H, and cob outlet, f, when arranged in connection with the shelling mechanism, C E, substantially as described.

Fourth, In combination with the subject matter of the preceding claim, the arrangement of the perforated chute, L, with hinged valve, N, and the reverse discharge board, M, the whole arranged and operating as described.

Fifth, The special construction and arrangement of the machine, consisting, essentially, of the bed, C, cylinder or cone, E, arms, G G, perforated floor, H, discharge board, I, exhaust fan, P, and the inclined chutes, L M, operating substantially as set forth.

60,826.—Horse Hay Rake and Seeder Combined.—John H. Bear, York, Pa.

First, I claim securing one or more seed hoppers, which are provided with seed dropping devices or guano distributors to the axletree of a hay rake, the teeth and driver's seat of which are applied to said axle, substantially as described.

Third, The combination of the hopper box, G, axletree, A, driver seat, D, and a lever for enabling the driver to hold the rake teeth down for harrowing in the seed, substantially as described.

60,827.—Saw.—Asa Bee, White Oak, West Va.

I claim the plane bit, or iron, a, when constructed with a groove or gutter, a', and secured to the blade of a saw, substantially as and for the purpose specified.

60,828.—Gate.—Edwin L. Bergstresser, Sunbury, Pa.

First, I claim pivoting the gate centrally to an overhanging sliding bearer, arranged substantially as and for the purpose specified.

Second, The sliding bearer to which the gate is pivoted, arranged to operate substantially as and for the purpose specified.

Third, The arrangement of the friction rollers, in the described relation to the post, and to the sliding bearer passing through said post, for the purpose specified.

Fourth, The employment of a weight or counterpoise, upon the outer end of the sliding bearer, which has the gate pivoted to its inner end, substantially as and for the purpose specified.

60,829.—Anti-Friction Oil.—J. F. Boynton, Syracuse, N. Y.

First, I claim a material for lubricating machinery, formed by combining sulphur with hydro-carbon oils, tars, or their equivalents, substantially as described.

Second, The combination of linseed oil with the products of gas tar and sulphur.

Third, The combination of any of the petroleum series of hydro-carbons, with the gas tar series as herein described, for the purpose set forth.

Fourth, The combination of the petroleum and gas tar series of the hydro-carbons, with sulphur, for the purpose set forth.

60,830.—Roofing Material.—John F. Boynton, Syracuse, N. Y.

First, I claim the combination of peat with gas tar products, as and for the purpose described.

Second, I claim the combination of muck with gas tar or gas tar products, as and for the purpose described.

Third, I claim in the combination of ground liqueous and fibrous materials, peat and muck, with gas tar or gas products, for the purpose described.

Fourth, I claim peat, muck, and disintegrated liqueous and ground fibrous materials combined with asphaltums, gas tar and its products, substantially as set forth and for the purpose herein described.

Fifth, I claim the combination of the silicate of soda, silicate of magnesia and the chloride of calcium for the purposes above specified.

86,831.—Carriage Spring.—C. H. Butterfield, Sturbridge, Mass., assignor to J. E. Taylor, Sutton, Mass.

First, I claim the clasp, D, constructed as shown, in combination with a single leaf spring, C, as described.

Second, I claim securing the spring C, to the bearing H B, by means of the close joint, E, in combination with the clasp, D, as and for the purpose set forth.

60,832.—Needle Gun.—A. Alphonse Chassepot, Paris, France.

First, I claim in a breech-loading fire-arm, the rigid connection between the needle carrying rod and the cock or hammer by which the said rod is operated and withdrawn from the breech bolt, substantially as shown and set forth.

Second, I claim the combination with the tubular breech bolt, of the needle rod and its rigidly attached cock or hammer and actuating spring under such an arrangement that by the retraction of the said rod from the breech bolt, the spring shall be compressed and the gun cocked, substantially as herein shown and described.

Third, In combination with the needle carrying rod, and the cock to which it is rigidly secured, supporting and holding the spring which surrounds the needle rod, between the front end of the said rod, and the rear end of the breech bolt, substantially as shown and described.

Fourth, I claim the combination of the needle rod and cock or hammer for operating the same, with a sliding and rotary breech bolt provided with slots, grooves or equivalent devices for limiting and determining the forward movement of the said hammer and rod, as herein set forth.

Fifth, I claim the combination of the needle carrying rod and its tenon, l, with the plug or bolt screwed in the rear end of the breech bolt, and perforated and recessed for the reception of the said rod and tenon, substantially as and for the purposes described.

Sixth, In a breech-loading fire-arm as herein described, I claim the combination with the tubular bolt or breech sliding in the breech receiver as specified, of the movable sheath or tube for receiving the needle, capable of a sliding and rotary motion upon the axis of the said breech, substantially as shown and set forth.

Seventh, I claim interposing between the head of the breech bolt and the flange formed on the movable needle sheath, a cylindrical disk or tube of vulcanized india-rubber, whose diameter is such as to allow it to slide freely in and out of the charge chamber, but at the same time, to cause it to hermetically close the said chamber when compressed between the needle sheath and the breech bolt by the action of the gases generated by the ignition of the charge, as herein shown and set forth.

60,833.—Apparatus for Turning the Leaves of Music.—Alvin B. Clark, Richmond, Ind.

First, I claim the swinging magnet, D, in combination with the clip, B, attached to the leaf, when operating substantially in the manner and for the purpose set forth.

Second, In an apparatus for turning the leaves of sheet music, suspending

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a magnet upon an oscillating arm, and so connecting the arm with a pedal, by intermediate mechanism that the leaves may be turned successively by the action of the foot of the player, substantially as described.

Third, In combination with the swinging magnet, D, I claim the clips, B, attached to the rod, C, when the latter is so arranged in relation to the center of oscillation, that the magnet shall be detached as the leaf is turned, substantially in the manner set forth.

60,834.—PHOTOGRAPHIC BATH.—Amasa Cobbs, Pittsburgh, Pa.

I claim the combination of the oscil ating bottom, F, with the box, A, in a nitrate bath, substantially as described and for the purposes set forth.

60,835.—MANUFACTURE OF ALCOHOL AND OTHER PURE DISTILLATES.—John F. Collins, New York City.

First, I claim the products derived from hydro-carbon, coal or mineral oils, petroleum or turpentine, distilled substantially as described.

Second, Spirituous liquors, alcoholic substances and essential oils, distilled from wash, mash, or other substances, in the manner substantially as described and set forth.

60,836.—DEVICE FOR DETACHING RUNAWAY HORSES.—E. P. Connor, Jeffersonville, Ohio.

I claim the arrangement of cap, E e G, notch, c, detent, F, and cam, H, or their equivalents, constructed and operating as set forth.

60,837.—CONVERTING RECIPROCATING INTO ROTARY MOTION. John Cupps, Chicago, Ill., and Amos R. Harper, Grandville, Mich.

We claim the employment of two rack wheels, or segmental circular racks in combination with two pinions on the driving shaft, arranged so as to be coupled alternately thereto, in such a manner as to produce continuous rotary motion, in one direction, substantially as and for the purpose herein specified.

60,838.—AUTOMATIC APPARATUS FOR REEFING SAILS.—John Davidson, Edinburg, North Britain.

First, I claim effecting the automatic reefing of sails by means of spring, lever, or equivalent mechanism arranged and applied to the sails, substantially as described, so that the extent of surface of the sails exposed to the action of the wind shall always be inversely proportionate to the pressure of the wind upon the said sails, substantially as herein shown and set forth.

Second, The herein described apparatus for effecting the self-reefing of sai's, the same consisting of a shaft or roller connected with a spring lever or equivalent mechanism, and engaging with one or more racks or guiding arms, projecting out from the mast, the said apparatus being so combined with the sail that the movement of the roller along its rack or guiding arm shall cause the sail to increase or diminish in size in inverse proportion to the force or pressure of the wind, substantially as herein specified.

60,839.—MACHINE FOR WIRING BLIND SLATS.—Elijah F. Dunaway, Indianapolis, Ind. Antedated Dec. 19, 1866.

I claim the arrangement of the cord, T, with the lever, C and J, and pulley, S, as herein described and for the purpos set forth.

60,840.—COAL STOVE.—B. Wells Dunklee, Boston, Mass.

I claim the arrangement of the combustion chamber, B, with its smoke exits, E F and H, with respect to the air tubes, D D and C, of the furnace, substantially in manner and for the purpose as above described.

I also claim the combination and arrangement of the flues E F and J, and their relative position with respect to the fuel supply door of the furnace, essentially as set forth and explained.

60,841.—TABLE.—J. E. Dust, Hyattsville, Ohio.

I claim the folding table, A B, stationary legs, C C', sliding legs, D D' and rotary waiter, G, forming a convertible, self waiting and folding table and side board.

60,842.—GRATE FOR FURNACES.—John Alexander, Green Post, N. Y.

First, I claim in grate bars, the grooves, e, and tapering holes, e', arranged in the manner and so as to perform the functions herein specified.

Second, I claim in combination with the above, the locking parts, E2 E5, on the ends of the perforated and grooved sections, E', and adapted to serve in combination therewith as herein specified.

Third, I claim in combination with the perforations, e' and grooves, e, the continuation of the webs, E', over the bearers so as to provide free access for the draft to the holes and grooves located in that part of the grate.

60,843.—DOVETAIL MACHINE.—Juan S. L. Babbs, New Albany, Ind.

First, I claim the construction and arrangement of the two platforms, A A, when applied in combination to the Hartwell patent dovetail machine, or its equivalent, substantially as and for the purposes herein described.

Second, I claim the use of said holdfasts or clamps in combination with the adjustable blocks, C C, as applied to the combined platforms, A A, when arranged and operating as and for the purposes herein described.

Third, I claim the use of the four spring check gages, D D D D, in combination with the platforms, A A, substantially as arranged and for the purposes as herein described.

Fourth, I claim the construction and arrangement of the two graduating gage teats, E E, in combination with the combined platform, A A, operating substantially as arranged and for the purposes as herein described.

60,844.—HEATING STOVE.—William A. Barlow, Elkhorn, Wis.

I claim the interior chamber, C, provided with a tilting or otherwise opening bottom, H, and a downwardly projecting pipe or flue, D, substantially as and for the purpose herein specified.

I also claim the combination of the chamber, C, constructed and arranged as above specified, and chamber, B, substantially as and for the purpose herein set forth.

I also claim the combination of the air circulating chamber, G, with the chambers, B and C, constructed and arranged as above specified, substantially as and for the purpose herein specified.

I also claim the air supplying openings or passages, d d, at the base of the chamber, C, constructed and arranged as above specified, substantially as and for the purpose herein set forth.

60,845.—HEATING STOVE.—William A. Barlow, Elkhorn, Wis.

I claim a deflecting plate, B, in combination with one or more air supplying pipes, C, arranged and operating substantially as and for the purpose herein specified.

In combination with the foregoing, I also claim the interior, downwardly extending pipe or flue, D, and an air-circulating chamber, E, surrounding said pipe, or flue, substantially as and for the purpose herein set forth.

60,846.—SEEDING MACHINE.—D. C. Baughman, Fort Seneca, Ohio.

First, I claim the combination of the two hoppers, G and J, with the shafts, g h, spur wheels, a a', pulleys, g1 g2, or their equivalents, and clutch, b b', upon the axle, C, and lever, c, which is acted upon by the bar, E, to which the drill teeth are attached, all operating substantially as described.

Second, Adapting the shaft, h, of the hopper, J, to serve as an agitator for this hopper, and also as a means for transmitting motion from the axle, C, to the shaft, g, of the hopper, G, substantially as described.

Third, The construction of seed guards, l, with openings, m, in their sides in combination with the rotary seed dischargers, substantially as described.

Fourth, Making the openings through the sides of the seed guards, l, larger at their upper ends than at their lower ends, substantially as described.

Fifth, Constructing the rotary seed dischargers, k, with discharging wings on each side, substantially as described.

60,847.—HEAD BLOCKS FOR SAW MILLS.—A. M. Beard (assignor to himself and Solomon McNeil), Hillsborough Bridge, N. H.

First, I claim the rotatin index, 4, supported on and carried by the log rest, B, and operated by a fixed rack, 1, and pinion, 2, substantially as and for the purpose herein specified.

Second, I claim in connection with the graduated indicating disk or index, 4, pinion, 2, rack, 1, and log rest or head block, B, an adjustable secondary index or graduated disk, 3, arranged and operating substantially as and for the purpose explained.

Third, I claim a hand lever, D, having a double pawl, d, which is controlled by an eccentric, G, and sub-lever, I, pivoted thereto, and having a second eccentric or cam, j, and rod, J, for lifting the head block or rest pawl, g, in connection with a spur wheel, E, pinions, c c, racks, a2, and rest, B, as and for the purpose shown and explained.

Fourth, I claim the balanced elbow shaped pawls, z, in connection with the stands, O, and sliding dogs, T, as and for the purpose described.

Fifth, I claim the rollers, q, pivoted to the tops of the stands, D, as and for the purpose set forth.

Sixth, I claim the stands, D, in combination with the movable rest, B, when the said stands are adjustable on the said rest, B, substantially as and for the purpose set forth.

60,848.—ROOFING.—Edmund Becker, Cincinnati, Ohio.

First, The bars, B, constructed substantially in the manner and secured at their base to the rafters of the roof as and for the purpose described.

Second, The pins, k, driven into the bars, B, in combination with the notched plates, A, substantially as described and for the purpose specified.

Third, The construction of the metallic sheets, A, provided at their upright sides with notches, h, secured to the roof by the bars, B, so as to have full liberty to expand and contract in all directions as and for the purpose set forth.

60,849.—SLATE WASHER.—Otis T. Bedell, New York City.

I claim a slate washer composed of a compressible water vessel, A, and absorbent wiper, B, combined substantially as herein set forth.

69,850.—CAR BRAKE.—Charles Bemis, Mishawaka, Ind.

I claim the arrangement of the lever, n, the chain, k, the pulleys, m m, and the shaft, c, connected with the shoes, a a, by the arms, c e, and the rods, g g, to operate as a railroad car brake as herein described.

60,851.—MANUFACTURE AND COATING OF LEAD PIPE.—Frederick Bennett, Watford, England, assignor to John S. George, Nassau, N. P.

First, I claim the within described process of manufacturing lead pipe by the use of a stationary mandrel in contradistinction to the mandrel generally used which moves with the piston of the hydraulic ram, substantially as and for the purpose described.

Second, The within described process of coating the interior of lead pipes with tin or other suitable material during the process of manufacturing the same by means of a hollow stationary mandrel, substantially as set forth.

60,852.—DIRECT ACTING ENGINE.—George F. Blake, Boston, Mass.

First, I claim the tappet rod, F, arranged as described for the purpose specified.

Second, The combination of the rod, F, lever, G, and valve rod, H, substantially in the manner described.

Third, The auxiliary exhaust arranged and operating substantially as specified.

Fourth, So controlling the supply ports of the main cylinder by the conjoint action of valves, M and N, that those valves shall together constitute a cut-off to arrest the supply of steam to either end of the main cylinder while that end is exhausting, substantially in the manner and for the purpose set forth.

60,853.—METHOD OF FASTENING BOILER TUBES.—James Bowden (assignor to himself, W. H. Colbanks, and Horace Theall), New York City.

I claim the wedge-shape ferule, C D, in combination with the nut, E, tube, B, and tube-sheet, A, substantially as set forth.

60,854.—WATER WHEEL.—Henry P. Bradbury, Springfield, Ohio.

First, I claim the combination of the three sets of buckets, C E F, substantially as and for the purpose set forth.

Second, The horizontal buckets, C, in combination with the vertical buckets, F, and the annular chamber, G, substantially as and for the purpose set forth.

Third, In combination with a wheel receiving its water horizontally, the post, M, and balanced gates, R, operated by the segment, S, and geared ring, I, substantially as and for the purpose set forth.

60,855.—SAW MILL.—Samuel Bristow, Bedford, Indiana.

I claim the grooved pulley, E, on the drum shaft, D, one end of said shaft having bearings in a movable standard, grooved pulley, C, on the driving shaft, A, chain, h, and lever, F, when constructed and arranged as herein set forth.

60,856.—TAG OR LABEL.—N. H. Bruce, Forge Village, Westford, Mass.

I claim a tag having a cord or string, or its equivalent, secured to it by passing such cord through a metallic tube or casing, or its equivalent, attached to the tag, substantially as and for the purpose described.

60,857.—APPARATUS FOR CHARGING GAS OR AIR WITH HYDRO-CARBON VAPOR.—W. H. Burridge, Cleveland, Ohio.

First, I claim the stepped or shelved partitions provided with basins or cups and flocculent material, in combination with the case, A, substantially as and for the purpose set forth.

Second, Arranging the steps or pans so as to enlarge the area or surface of the same from top to bottom, and so that the evaporating capacity will be increased in proportion to the increasing density of the fluid by the elimination of the lighter portions.

Third, The plate, C', volute curtains, C, in combination with the partitions, B', arranged substantially as and for the purpose set forth.

60,858.—WEIGHING APPARATUS.—Benjamin Churchill, Wareham, Mass.

I claim, connecting the auxiliary rod or beam, F, to the main beam by means of the arms, F' F', each side of the axis of motion of the beam, so that the poise on the auxiliary beam may be traversed across the axis of the beam, outside of or beyond the axis of the beam, substantially as described.

60,859.—MACHINE FOR CLEANING COTTON, ETC.—Robert J. Clay, Williamsburg, N. Y., assignor to J. H. Clark, E. Walsh, J. Donaldson, and J. H. Walsh.

First, I claim the machine for cleaning and relinting damaged cotton, constructed and arranged substantially as herein described.

Second, The toothed revolving cylinders, E E', and the rubber-sheathed rollers, e e' f f', and g g', in combination with the fan-blower, G, the traveling screens, B B', and the revolving wire cylinders, D D', connected and operated substantially as and for the purposes herein described.

Third, The cylinder teeth, c c, chamfered on four sides to form a pyramidal pointed picker, in the manner and for the purposes herein described.

60,860.—FLOUR BOLT.—William F. Cochrane, Springfield, Ohio.

First, I claim the combination with the reel, reel-spout, and pump, of the ventilating valve, E, as and for the purpose described.

Second, The arrangement of the feed-spout, pump-barrel, packed piston, and reel-spout, with relation to each other and to the reel, as and for the purpose described.

Third, The combination with the feed-spout and pump-barrel of a flour-pump, of the piston packing blocks, spring blocks, spring boxes, and woolen packing, as and for the purpose described.

60,861.—STEAM ENGINE.—Stephen F. Davenport, Hallowell, Maine.

I claim my improved steam engine, made substantially as described, viz.: of the cylinder, A, the internal piston cylinder, B, the piston, C, and their steam passages, ports and valves, arranged in manner as represented, and so as to operate as described in order to cause the piston-head, B, to be moved by the unexpanded and expanded steam, substantially as explained.

60,862.—TARGET FOR AIR GUN.—Charles A. Demling, New York City.

I claim, Dividing a target into a series of parts, C, each of which is acted upon separately by the ball or projectile, but all of which are re-adjusted at the same time, by a combination of the rail, e, springs or weights, f, and rope, g, with the bar, B, rails, d, and post, A, substantially in the manner and for the purpose herein specified.

60,863.—TOY GUN.—Samuel R. Dummer, New York City.

I claim a toy gun constructed substantially as described, to project a ball secured to the end of an elastic cord, which is stretched between the ends of the barrel portion.

60,864.—METHOD OF REMOVING BARS FROM RIVERS AND HARBORS.—Sydney S. Durfee (assignor to himself and Charles A. Gregory), Chicago, Ill.

I claim the method of removing bars of sand, or mud, or gravel, in the beds of rivers, or at the mouths of ports and harbors, or similar places, by placing obstructions or agitators upon said bars, for the purpose of breaking up the current and thereby causing it to cut into and wash away the bar, all substantially as above shown.

60,865.—RAILROAD FREIGHT CAR.—Richard Eaton, Montreal, Canada.

First, I claim the truck for freight cars with six wheels and wrought-iron housings, H, constructed and arranged substantially as and for the purpose described.

Second, I claim the cogged friction rollers, f f, placed between bearing-plates on the car-bed and truck-frame respectively, and operating substantially as described.

60,866.—SCAFFOLD BRACKET.—Charles Eddy, Grass Lake, Michigan.

I claim the bar, A, provided with the arms, B B, the said arms being provided with spurs, a a, and e e, either or both, for the purposes and substantially as shown and described.

60,867.—FURNACE.—William Ennis, Hudson, N. J.

I claim the combination of the basket grate with its sides made of overlapping slats, as described, air chambers, G, and supply apertures, a a, constructed and arranged substantially as and for the purpose or purposes herein specified.

60,868.—RAILROAD CAR.—Joseph S. Fairfax, Wheeling, West Va.

I claim the arrangement of the vibrating pedestals, B B, connected with and supported by the cross-braces, b b, and the center block, c, combined with the rods, e e, the splinter-bar, f, and the spring, g g, when applied to a street railroad car, constructed and operating substantially as and for the purposes herein described.

60,869.—COMBINED FOOT-STOVE AND LANTERN.—D. P. Farnham and M. P. Farnham, Janesville, Wis.

First, I claim plate, s, heat distributors, t t t t, and lid, A, when constructed and combined substantially as and for the purposes described.

Second, The foot-stove, A B, lamp and lantern, E F, when constructed and combined substantially as and for the purposes described.

60,870.—STEAM GENERATOR.—Henry Feyh, Columbus, Ohio, assignor to himself and George T. Emery. Antedated Sept. 13, 1866.

First, I claim pipes or tubes leading from the main water-chamber through the fire-box, communicating with pipes or tubes which also lead through the fire-box, but which enter a water-chamber, E, that extends above the water level, for producing a forced circulation of water in steam boilers, substantially as described.

Second, Pipes or tubes of different diameters, the smaller of which lead through the fire-box and into a chamber that extends above the water level, for conducting the water from the main water-chamber of a boiler, substantially as described.

60,871.—ATMOSPHERIC DENTAL PLATE.—Nehemiah T. Folsom, Laconia, N. H.

I claim a packing-ridge applied to the surface of the atmospheric plates of artificial teeth, substantially as and for the purpose herein specified.

And I claim this invention whether as a single ridge, or more, whether entirely encircling the plate, or partially only, whether close to the edge or farther from it, and in different directions, and with any material as set forth.

60,872.—WINDOW-BLIND FASTENER.—Charles B. Francis, Newark, N. J.

I claim the metallic strap, D, and slotted bar or lever, E, for the purpose of holding the slats of window-blinds at any desired angle, substantially as and for the purposes herein described.

60,873.—PORTABLE FIELD FENCE.—Jacob J. Friend, Altona, Ill.

I claim the rails, B, so arranged as to have their ends project from the panels, A, of one section, on to the back edges of the panels of another section, and intervene between the rails of the panels thereof, and the bolt, E, and key, F, in combination with the panels, brace, and foot-board, substantially in the manner and for the purpose as herein set forth.

60,874.—DRAWER LOCKS.—E. L. Gaylord, Terryville, Conn.

I claim the adjustable wards, D, in combination with the bolt, B, and one or more tumblers, C, arranged substantially in the manner as and for the purpose herein set forth.

60,875.—PLOW.—P. M. Gilbert, Kewanee, Ill. Antedated July 1, 1866.

I claim the arrangement and combination of the subsoil plow, F, the bar, D, loop, H, and clasp, E, with the beam of any ordinary mould-board or gang plow, as and for the purpose specified.

60,876.—AXLE FOR VEHICLE.—A. W. Gillett, Sparta, Wis.

I claim the employment of the bands, B B', in combination with the axle, A, the said bands being constructed of soft metal and confined to the axle in the manner and for the purpose herein set forth.

60,877.—COOKING RANGE.—W. A. Goodher, Burlington, N. J.

I claim the ovens, c c', and fire-place, D, in combination with the casings, A, and B, and pipes, G G, and, J', or their equivalents, the whole being constructed and arranged substantially as and for the purpose described.

60,878.—FILE CUTTING MACHINE.—Isaac Goodspeed, Norwich, Conn.

First, I claim the swinging hammer, H, operated through the medium of the arm, E, and crank pulley, D, in combination with the cutter-stock, I, substantially as and for the purpose set forth.

Second, The arm, F, provided with the pins, O O', and the upper curved edge, i, in combination with the cutter-stock, I, provided with the springs, N N', the pin, o, and slot, f, to receive the shaft, L, on which the cutter-stock works, substantially as and for the purpose set forth.

Third, The taper screw, P, in combination with the slotted cutter stock, I, substantially as and for the purpose specified.

Fourth, The spring, T, attached to the sliding-bed, Q, in combination with the spring clamp or pressure plate, R, attached to the base, A, by the screws, q q, substantially as and for the purpose set forth.

60,879.—COTTON CULTIVATOR.—Nicholas Gotten, Union Depot, Tenn.

First, I claim the frame, A, provided with the slots, a a', being at right angles in combination with the scraper, B, so that the scraper, B, may be adjusted and secured at different angles to the frame, A, substantially as shown and described and for the purposes set forth.

Second, I claim the peculiar construction of the frame, A, with the lower portion running upon the ground so as to form a gage for the scraper, substantially as shown and described.

60,880.—MACHINE FOR RAKING AND COCKING HAY.—Francis Granger, Homer, Ill.

I claim the elevator, l, carrying by its own gravity the hay up the rake teeth, g, in combination with the rake, g h, the adjustable frame, m, and the hinged receiver, d, substantially as described.

60,881.—LIFTING JACK.—George F. Graves, Mount Upton, N. Y.

I claim the thumb-piece, d, of the toothed locking bar, C, in combination with the lever, B, arranged with the standard, A, substantially as described for the purpose specified.

60,882.—TATTING SHUTTLE.—A. B. Greenwalt, Baltimore, Md.

I claim the tatting shuttle as an article of manufacture provided with a pin thumb knob and retracting spring, substantially as described.

60,883.—MEDICAL VACUUM APPARATUS.—George Hadfield, Cincinnati, Ohio.

First, I claim the medical vacuum chamber or receiver, composed of several separable parts, A B and C, so as to be accessible from the ground level, in the described combination with an impervious and flexible envelop, L N, adapted to tightly invest the receiver and the head of the patient, substantially as set forth.

Second, The receiver proper, consisting of the circumferentially grooved base, A, through which the exhaust tube passes, a side portion, B, fixed to said base, and a movable side portion, C, hinged to the fixed side as described.

Third, In the described combination, I claim the circumferentially grooved base, A, and elastic band, M, for securing the lower edge of the cloak or envelope, as set forth.

Fourth, The flexible air-tight envelop, consisting of the cloak, L, cap or hood, N, and elastic band, M, for the purpose explained.

60,884.—CONVERTING WHEEL-CARRIAGES INTO SLEIGHS.—O. B. Hale, Chicopee, Mass.

I claim the runner, A, when the same is attached to the wheel by means of the clamp, H K, and to the frame of the carriage by means of the arrangement of the nut, B, rod, E, and clamp, F G, combined and operating substantially as herein set forth.

60,885.—INDELIBLE PENCIL.—Wm. B. Hale, Northampton, Mass., assignor to Northampton Indelible Pencil Co.

I claim the combination by which the head of the pencil becomes the stopper or cap of the case, and thus serves as its own protector, doing away with the necessity which has heretofore existed, of inclosing the pencil in a glass vial with a cork stopper and protecting the vial by a wood, metal or paper holder.

60,886.—SHOE BRUSH AND CASE COMBINED.—Charles Hamilton, New York City.

I claim the combination of a boot and shoe blacking brush, polishing brush, blacking box and case, constructed and arranged in the manner herein substantially set forth and described.

60,887.—PROPELLER.—Benjamin Handforth, Chicago, Ill.

First, I claim, in combination with a reciprocating shaft, A, the buckets, B and E, arranged and operating substantially as herein described and for the purpose set forth.

Second, I claim, in combination with the shaft, A, and buckets, B E, the arrangement of the slide, C, valve, D, and ring, F, substantially as and for the purposes described.

Third, In combinaton with the above, I claim the arrangement of the alternating stops, Y M, operating substantially as and for the purposes shown and described.

60,888.—FEEDING DEVICE FOR SEWING MACHINES.—John Hanlon, Bridgeport, Conn.

First, I claim the slotted T frame or cross, D D', so constructed and arranged as to contain within its vertical slot the feed bar, E, substantially as described.

Second, I also claim the use of the bolt head, C, grooved substantially as shown to receive the "cross" or slotted T frame, D D', substantially as described.

Third, I also claim the combination of the slotted T frame or cross, D D', with the feed bar, E, when the body of the latter is contained within the former, substantially as described.

Fourth, I also claim hinging the lever, K, to the "cross" or slotted T frame, D D', substantially in the manner above described.

Fifth, I also claim combining the lever, K, hinged to the slotted T frame or "cross," as above shown with the feed bar, E, substantially as described.

Sixth, I also claim combining the "cross," D D', the feed bar, E, and the lever, K, which communicates motion to both the slotted T frame or "cross" and the feed bar, substantially as described.

60,889.—FENCE POST.—B. S. Haviland, Fort Dodge, Iowa.

First, I claim an improved cast or wrought iron fence post, A, constructed as herein described, having a portion, a', of the lower part which enters the ground bent over at right angles to the plane of the post, substantially as described and for the purpose set forth.

Second, The combination of the slide bar, C, constructed as described with the post, A, substantially as described and for the purpose set forth.

Third, The combination of the key, D, with the post, A, substantially as described and for the purpose set forth.

60,890.—MANUFACTURE OF SOAP.—Charles W. Hermance, Albany, N. Y.

First, I claim combining and saponifying the tallow, resin, and oils herein specified by the process and in the proportions stated.

Second, The combination of borate of soda with the saponified tallow resin, and oils, in the proportions stated and in the manner set forth.

60,891.—CONDUCTORS' TICKET BOX.—Henry Hise, Ottawa, Ill.

First, The box, A, provided with the apartment, F, spring, m, lid, C, and chamber, D, arranged and combined and operating in the manner shown and described and for the purpose set forth.

Second, The secondary box, E, when used in connection with box, A, and constructed of the two parts as described, box proper and lid, the latter (provided with a slot, l, and lip, f') as shown and described and for the purpose set forth.

Third, The tickets, B, having the slots, i j and j', for the purpose set forth

Fourth, The combination of tickets, B, with box, A, constructed and arranged as described.

Fifth, As a complete method of detection, or as a safety guard, I claim the combination of box, A, tickets, B, and deposit box, E, constructed, arranged and operating substantially in the manner described and for the purpose set forth.

69,892.—CULTIVATOR.—J. C. Hoffeditz, Mercersburg, Pa.

I claim the arrangement shown and described consisting of the adjustable and pivoted spring standard, C, removable shares, I J, and adjustable handles, E.

60,893.—MODE OF ATTACHING CULTIVATOR TEETH.—J. C. Hoffeditz, Mercersburg, Pa.

I claim the arrangement of the cultivator standard, C, hanger, B, and wooden pin, e, as described and represented.

60,894.—BUTTER MOLD.—H. W. Hopkins, Milford, N. H.

I claim constructing butter molds of steatite or soapstone, substantially as herein described.

60,895.—DRILL.—Henry Hufendeck (assignor to S. R. Fox, E. G. Pratt, and E. W. Fox), St. Louis, Mo. Antedated Dec. 12, 1866.

I claim, First, The combination of two or more sets of corresponding bevel gear wheels, arranged substantially as shown by C and D C' and D', with the changeable shaft support, when used as set forth.

Second, The combination of the feed screw, b, and its actuating hand wheel, b', or their equivalents, with the drill shaft, B, all supported in the bearings, a a' and a2 of A, in combination with the several sets of corresponding bevel gear wheels, C and D and D' and c, the changeable shaft support, G, and the work table, H, as set forth.

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60,896.—PENMAN'S ASSISTANT.—Henry A. Hutson, Newburg, N. Y.

First, I claim the rings, 1 2 3 and 4, constructed and arranged in such peculiar manner as substantially described, for compelling the fingers to assume their respective positions, and to strengthen them in supporting the hand and fore arm while writing.

Second, I claim the stem, B, for preventing a cramped position of the hand, by affording a prop or support to the fingers, with screw, H, for adjusting to different sized hands, and for dividing the assistant to secure it in a small case for the pocket.

Third, I claim the stem, C, for projecting to form a rest at I, for the pen holder, and forming a base for the stem, B, in the hollow of the hand.

60,897.—ALARM GUN.—Albert Johnson and Sydney E. Allen, Raleigh, N. C.

I claim the base, A, gun barrel, D, spring hammer and trigger arm, J, and arms, P and Q, attached to the barrel, when all are constructed and combined together substantially as and for the purpose described.

60,898.—PROCESS FOR OBTAINING THE PRECIOUS METALS FROM THE BEDS OF RIVERS.—John Johnson, Saco, Me.

I claim the system herein set forth for obtaining gold from the beds of rivers, substantially as specified.

I also claim the process by the means employed for the purpose intended, substantially as specified.

60,899.—MODE OF GATHERING AND TREATING AURIFEROUS SANDS FROM THE BEDS OF RIVERS.—John Johnson, Saco, Me.

I claim the process of raising and treating auriferous sands found at the bottom of rivers and lakes, substantially as described.

I also claim the combination of the pumping apparatus with separators, concentrators, agitators, and amalgamators, when they are operated on board a floating barge, substantially as described.

60,900.—MACHINE FOR MAKING WOODEN PICKETS.—Thomas J. Jolly, Versailles, Ind.

I claim, First, The arrangement of the sliding gage or pattern, E, studs, G, compound lever, I, and fingers, J and K, for upturning of the sawn paling, as set forth.

Second, In the described combination, the saw, upturning apparatus, and guides, I claim the double-headed raking planer, N N', adapted to operate as set forth.

Third, The arrangement of the segment roller, R, checks, S S', and planers, N N', substantially as and for the purposes specified.

60,901.—SASH FASTENER.—J. W. Judd, New Haven, Conn.

I claim the shaft, G, bolt, F, spring, I, and tail piece, L, constructed and combined as herein described, in combination with the lever, S, as set forth.

60,902.—SNAP HOOK.—Oliver S. Judd, New Britain, Conn.

I claim, as a new article of manufacture, a snap hook, constructed substantially as and for the purpose described.

60,903.—ANCHOR.—Charles T. Julius, Philadelphia, Pa.

I claim the arms, e and e' hinged to and otherwise combined with an anchor, substantially as and for the purpose described.

60,904.—TRUSS.—John A. W. Justi, Savannah, Ga.

I claim constructing a hernia truss, with an elastic metal plate, A, formed by bending in three distinct arches, the two outside arches being twisted and curved, proportioned and arranged with reference to the pads, a a, substantially as and for the purposes herein specified.

60,905.—POCKET KNIFE.—George Kay and Joseph Kay, Esopus, N. Y.

I claim the arrangement of the bent spring, B, between the rivet, a, and flange, b, in combination with the side plates, A A, constructed and operating in the manner and for the purpose herein specified.

60,906.—CATTLE CAR.—Moses T. Kehoo, Amsterdam, N. Y.

I claim the attachment to and combination with a railroad car, of chains or ropes, with a windlass for operating them in the manner described, and for the purposes set forth in this specification.

60,907.—WASHING MACHINE.—John B. Kinney, Yellow Springs, Ohio.

I claim the arrangement of the compound lever, D F, vibrating rubber, H, and shiftable bottom or washboard, J, the whole being constructed and adapted to operate as set forth.

60,908.—CURTAIN FIXTURE.—A. H. Knapp, Newton Centre, Mass.

I claim the combination of the projecting knob or milled head, D, with the coiled spring, B, cog wheel and pinion, E and F, and roller coupling, d, substantially as and for the purpose herein specified.

I also claim the square, angular, or equivalent form of recess, G, through the center of the roller, formed in connection with the wedge groove therein, for the purpose set forth.

60,909.—SPRUE FOR MOLDERS.—Patrick W. Lamb, Albany, N. Y.

I claim the toothed sprue pattern, C, constructed substantially as described, and applied so that the spaces molded by it communicate with the handle forms, e, at their center, over the handle shanks or rods, c, essentially as and for the purpose or purposes herein set forth.

60,910.—MAGAZINE FIRE-ARM.—Thomas W. Lane, Boston, Mass., assignor to the Spencer Rifle Company.

I claim an oscillating retractor, working in the body of the rolling breech, and which is depressed during the backward rotation of the breech by a positive movement, and elevated by a spring when the breech is rolled forward into its locked position, as described.

I also claim the combination and arrangement of the shaft, t, arm, h, groove, w, and pin, x, in the manner and for the purpose set forth.

60,911.—LOUNGE FOR INVALIDS.—Robert Leaman, Hillsborough, Ohio.

I claim, First, The jointed rails, g g, in combination with cleats, P P, and buttons, i i, the whole arranged and operating as and for the purpose herein set forth.

Second, The employment of pulleys, m and v, cord, a, and frame, R, when used in combination with jointed rails, g g, the whole constructed and operating in the manner and for the purpose herein specified.

60,912.—SHAFT COUPLING.—J. F. Light, Worcester, Mass.

I claim the combination with the ends of two shafts or rods, of a friction coupling piece, C, tightening nuts, D, and spline or splines, E, substantially as set forth.

60,913.—BED BOTTOM.—Charles P. Loeser, Hartford, Conn.

I claim the hook and eye plates, d d,' frame work, a, springs, b, supporting cord, c, with the supporter, g, and steps, i, substantially as and for the purpose described.

60,914.—CORN PLANTER.—Charles Long, Paris, Ill,

First, I claim the arrangement of cog-wheel, J, balanced on yoke, I, and engaging with pinion, K, upon the ground wheels axle, at the option of the husbandman, by means of the lever, L, rod, M, and catch, N, substantially as and for the purposes set forth.

Second, The combination in a power corn planter of the frame, A, wheels, B B', engaging and releasing mechanism, E E, the whole being combined with the elements of the preceding clause in the manner set forth.

60,915.—MODE OF FINISHING FIRE ARMS SO AS TO PREVENT OXIDATION AND CORROSION.—J. Allen, New York City, and S. P. Townsend, New Providence, N. J.

First, We claim the finishing of fire arms of all descriptions by the mode and means hereinbefore described, and for the purpose of preserving them from damage by oxidation or corrosion as set forth.

Second, The restoration of damaged arms to good condition by the method and means above set forth.

60,916.—CULTIVATOR.—Theophilus F. Bertrand and Peter Sames, Rockford, Ill.

First, We claim the combination, substantially as described, of the tongue with the axle, arranged as set forth for the purpose specified.

Second, The combination with the tongue, of the single cross-piece, E, so arranged as that it shall serve as a brace for the segment and a fulcrum for the levers that control the auxiliary frame,

Third, The combination of two spring bolts with two supporting levers and two ratchets and with the axle, arranged and operating substantially as and for the purpose set forth.

Fourth, The combination of the rigid frame with the auxiliary frame, when the former is hinged to the latter, substantially in the manner and for the purpose described.

Fifth, The combination of the auxiliary frame with the tongue, when the former is hinged to the latter, substantially as and for the purpose set forth.

Sixth, The combination of an adjustable support for the driver's feet, with the auxiliary frame, substantially as and for the purpose set forth.

Seventh, The swivelled eye bolt or double block constructed, arranged and operating substantially as and for the purpose set forth.

Eighth, The combination of the eye bolt and standard, with the auxiliary frame, substantially as and or the purpose set forth.

60,917.—INSTRUMENT FOR ACUPUNCTURATION.—Anson R. Brown, Litchfield, Mich., assigns one-half interest to Gardner Herrick, Albion, Mich.

I claim the channeled puncturing point formed by two or more converging points substantially as described.

I also claim the perforated block, G, for retaining the medicine in the reservoir except at the needle holes, substantially as specified.

60,918.—PEAT MACHINE.—Samuel Marden (assignor to himself and Dustin Lancy), Newton, Mass.

First, I claim the tearing apparatus composed of metallic plates notched in the manner of saw plates set and arranged at different angles in the drum beater, B, in combination with the flexible apron, A.

Second, I claim the vibrating sieve operated upon by the cam, d, as applied to or in combination with peat machines, substantially as described.

Third, I claim the cam, d, arranged and operating upon the sieve arm, e, so as to sift the reduced peat substantially described.

Fourth, I claim the cam, I, so constructed and arranged with respect to the sliding molds, m m, etc., and the guard, n, that the pressure on the guard by the sliding molds ceases for a space equal to the width of the sliding molds as they emerge from the guard.

Fifth, I claim the circular mold carrier, E, revolving about the fixed cam, C, as combined and arranged with the compressing guard, n, it being also provided with a radial grooved, i i, etc., converging towards its center and supporting sliding molds, m m, etc., operated upon by the cam, l, and the spiral springs, p p, etc., which keep the sliding molds in proximity to the cam, all combined and arranged for the purpose of compressing peat, and as applied to peat machines substantially as described.

60,919.—PUMP.—Reuben A. M. Canley, Baltimore, Md.

First, I claim the pump, A, with its side chambers, E and F, piston chamber, B, openings, o and r, receiving and discharging ports, e f j and k, arranged, constructed and operating in the manner substantially as shown and described, and for the purpose set forth.

Second, In combination with said pump pipe, J, and the connecting guide sleeves, n, constructed, arranged and operating in the manner substantially as shown and described and for the purposes set forth.

60,920.—CAR COUPLING.—J. McLaughlin, Duncommon, Pa.

I claim the slide, D, provided with the pendent pin, c, and connected with the suspended weight, F, in connection with the coupling pin, B, and link or shackle, C, all arranged to operate substantially as and for the purpose herein set forth.

60,921.—ARTIFICIAL ARM.—A. McOmber, Schenectady, N. Y.

First, I claim the permanently attached clasps, g g', on the stump section of the arm in combination with the slotted plate, a e e, of the opposite section, substantially as and for the purpose set forth.

Second, The application to a spring thumb of an artificial hand, of a latch or its equivalent for holding said thumb open when desired, and means for releasing the thumb from the latch, substantially as described.

60,922.—MACHINE FOR SQUARING TILES.—Andrews T. Merriman, Rutland, Vt.

First, I claim the vertical pin, e, in combination with the plate, c, to which the tiles are clamped substantially as herein described, so that the plate can rise and fall and sweep over the grinding disk in a circular or oscillating motion.

Second, The adjustable collar, g, in combination with rising and falling swinging plate, c, constructed and operating substantially as and for the purpose set forth.

Third, The clamp, i, composed of a hinged lever with thumb screw and elastic pad as and for the purpose described.

Fourth, The adjustable gage, m, in combination with the clamp, i, and plate, c, constructed and operating substantially as and for the purpose set forth.

60,923.—CAR COUPLING.—F. H. Meyers, Wilmington, Del.

I claim the combination of the lever, H, spring catch, G, the sliding rod, C, and coiled spring, D, with each other and with the bolt, I, and bumper, A, substantially as herein shown and described,

60,924.—HANDLE FOR SAWS.—Eli Morris, Jr., New Haven, Conn.

I claim constructing the handle of a saw frame of metal integral for the most part with the frame, and joined by riveting or otherwise to another separate piece to complete the whole as set forth.

60,925.—LUBRICATING DEVICE.—G. M. Morris, Cohoes, N. Y.

I claim the within-described lubricating device, consisting of the slotted hanger, A, slotted journal box, C, disk, M, spring, b, oil cup, D, and groove or channel, c c, all combined and operating as and for the purpose set forth.

60,926.—LOGGING SKID.—G. W. Nichols, River Falls, R. I.

I claim the application to a skid of the props, D D, in combination with the ledge, B, or its equivalent, the plate, F, with its spur, and bolt, G, constructed substantially as and for the purposes specified.

60,927.—WIND MILL.—Wm. D. Nichols, Chicago, Ill.

I claim the combination of the sail cranks, p p, and sliding head, H, constructed, arranged and operating as and for the purpose herein specified.

I also claim the adjustment of the force of the counter spring or springs, O, by means of the fixed pin or pins, q, and the turning of the spring itself, or the equivalent thereof, substantially as and for the purpose herein set forth.

I also claim the arrangement of the governor weights, S S, attached to radial sliding rods on the sails themselves, and connected by means of the quadrant arms, R R, and connecting rods, v v, or their equivalents, with the regulating sliding head, H, substantially as herein described.

60,928.—THRASHING MACHINE.—Nelson Palmer, Hudson, N. Y., assignor to himself and T. G. Palmer, Schultzville, N. Y.

I claim a concave, so connected with a thrashing machine that it may be adjustably placed on one side or the other of the thrashing cylinder, for varying the character of the work, substantially as set forth.

60,929.—THRASHING MACHINE.—Nelson Palmer, Hudson, N. Y., assignor to himself and T. G. Palmer, Schultzville, N. Y.

First, I claim a thrashing cylinder when constructed with longitudinal ribs which are smooth upon one side and rough upon the other, substantially as and for the purpose set forth.

Second, In a thrashing machine, the use of two ribbed concaves or rubbers, on one of which the ribs are smooth on their faces and on the other rough, substantially as and for the purpose set forth.

Third, So constructing the concaves of thrashing machines that the straw may in the action of the machine be brought into contact with either smooth or roughened ribs or faces of ribs as desired, substantially as and for the purpose set forth.

Fourth, A thrashing cylinder when so connected with the motive power and related to the concave or concaves and other parts of the machine that it may be operated revolving in either direction, substantially as set forth.

Fifth, In combination with a thrashing cylinder having ribs smooth upon one side and rough upon the other, I claim a ribbed concave or ribbed concaves so constructed and arranged as to present smooth faces to the smooth faces of the thrashing cylinder when revolving in one direction, and roughened faces to the rough faces on the ribs of the thrashing cylinder when revolving in the reverse direction, substantially as and for the purpose set forth.

60,930.—CAR BRAKE.—Phineas Pardee, New Haven, Conn.

I claim the arrangement of the shoe, E, in combination with a holder and the shaft, F, or its equivalent, when arranged in such relative positions to the wheels as to operate in the manner substantially as herein set forth.

60,931.—DAMPING BRUSH.—J. K. Park, Marlborough, N. Y.

I claim the construction of a brush with a central part, A, of india rubber or equivalent elastic material, and a covering of cloth, felt or other absorbent material, substantially as herein set forth, for the purpose specified.

60,932.—STEAM-ENGINE VALVES.—Samuel J. Peet, New York City.

I claim the pair of valve plates, b b, in combination with the conical wedge, h, on the screw, C, or its equivalent, arranged and operating substantially as and for the purpose herein described.

60,933.—HORSE-POWER.—W. L. Peet, Maple Rapids, Mich.

I claim the combination of the sliding frame, B, wheel, Q, endless chain, P, and driving wheel, F, constructed and arranged to opperate in the manner as and for the purpose herein specified.

60,934.—REFRIGERATOR.—Chas. F. Pike, Providence, R. I.

First, I claim the horizontal tubes or pipes, I, substantially in the manner and for the purposes hereinbefore specified.

Second, I claim the horizontal tubes or pipes, I, in combination with the ice box, H, with or without the upright pipes or tubes, J, and pan, R, and its appendages and appurtenances, substantially in the manner and for the purpose hereinbefore stated.

Third, I claim the air-pipe, K, and also the air pipe, L, or their equivalents, in combination with the ice box or receptacle, H, the upright tubes or pipes, J J, or the horizontal tubes or pipes, I, and also in combination with either of them and with the pan, R, and its appurtenance, substantially in the manner and for the purposes hereinbefore stated.

60,935.—HOISTING TACKLE.—J. C. Price, New Philadelphia, Ohio.

I claim the clamp, G, in combination with the plates, A A, wheels, B B', ropes, C D, collar, E, and ring, F, all arranged to operate in the manner substantially as and for the purpose described.

60,936.—SELF-CENTERING TOOL.—A. Puckett, Terre Haute, Ind.

I claim the sleeve screw, C, and the center drill, D, in combination with the scroll chuck, A, constructed, arranged and operating in connection therewith, substantially as and for the purpose herein specified.

60,937.—LAMP CHIMNEY.—Charles H. Reichman, New York.

I claim a glass chimney for lamps constructed of two sections, the adjoining parts of which are provided with flanges, a b, held together by a narrow metal band slipped over the upper part and resting on its flange and sprung over the flange of the lower part,

60,938.—PLOW.—Freeman F. Reynolds, Burke County, Ga.

I claim the adjustment of guide bar, J, to helve, G, by bolts, P P, the advantage and object of which will be seen in above description, and as incidental to and necessary to the proper running of this stock; also the adjustment of brace, H, to helve, G, by shoulder, S, and bolt, K, and to beam, A B, by perpendicular bolt, N, by virtue of which the plows are more easily adjusted to the stock, and less liability to choking, and strength added thereto, the several parts being in combination, as specified,

60,939.—MACHINE FOR MAKING EYELETS.—Levi Richards (assignor to himself, Thos. R. Rathbun and Charles J. Richards), Providence, R. I.

First, I claim the combination of the sliding-rod, M, punch, N tube, O, flanged socket, P, and spring, Q, with the finishing die, L, substantially as described, as and for the purpose specified.

Second, The conveyor or carrier, H, provided with the chamber, i,* and arranged to operate in connection with the female dies and tubes, substantially as and for the purpose specified.

60,940.—FIBER FROM PINE LEAVES, FOR HYGIENIC AND OTHER PURPOSES.—Adolphe Rogue, Brire, France, assignor to Jacques Guedin, New York City.

I claim the within-described process of producing a hygienic wool from pine leaves, by treating them substantially as specified.

60,941.—HAND HOE.—C. A. Rose, Columbus, Georgia.

First, I claim making the eye, A, and blade, B, separate, and securing them to each other by bolts and nuts substantially as herein shown and described.

Second, Making the blade, B, of the hoe reversible, and with two cutting edges substantially as herein shown and described.

60,942.—PRESERVING BUTTER, MEAT, ETC.—William Ross, of Day's store, Pennsylvania.

I claim a chemical preparation for preserving butter and meats, composed of the ingredients and in about the proportions substantially as herein specified.

60,943.—STEAM ENGINE.—Hamilton Ruddick, Boston, Mass.

I claim the arrangement of piston heads, B B', rods, b b, connecting rod, D, and crank, E, relatively to each other and the cylinder, A, substantially as described.

60,944.—COMPOSITION FOR LINING OIL BARRELS.—John P. Schenck, Jr., Matteawan, N. Y.

I claim an improved composition for lining and coating the interior of oil barrels, and other surfaces, formed of glued acetic acid, water, lime, and carbonate of iron, combined with each other in the proportions and in the manner herein specified and described.

60,945.—CARRIAGE JACK.—H. S. S. Shepardson, Shelburne Falls, Mass.

I claim the standard, B, and lift, C, in combination with lever, F, and toggle, G G', constructed substantially as described.

60,946.—CHURN.—R. W. Shriner, Woodland, Mich.

I claim the screw, g, and its combination with the nut, i, slide, D, and driving wheel, C, constructed as shown for the purpose of imparting the aforesaid motion to the dasher, G.

60,947.—SCAFFOLDING FOR DRY DOCKS.—James E. Simpson, Brooklyn, N. Y.

I claim the combination of the stationary guide and support rail, a, the sliding shoe, b, and the hinged or folding upright, f, arranged to operate substantially as described.

And in combination with the folding upright, I claim the folding arms, i, hinged to and folding up against the upright, and maintained in horizontal position when in use substantially as set forth.

I also claim in combination with the folding upright and its hinged arms the folding top piece, o, applied and operated substantially as described.

60,948.—FERTILIZER.—Amor Smith, Cincinnati, Ohio.

I claim the hereinbefore described process for preserving the fleshy parts of boiled animal matter from decomposition by subjecting it to pressure, substantially as set forth.

60,949.—MITTENS.—A. P. Smith, Sterling, Ill.

I claim a mitten cut in sections, the thumb formed in part of the material taken from the thumb space without being wholly detached in the cutting, all the parts united with the lining by a simple operation, substantially as described.

60,950.—LATHE RESTS.—Henry K. Smith (assignor to Charles Osgood), Norwich, Conn.

First, I claim the combination of the friction clutch, X, or its equivalent with the worm gears, A2, connected together by pinion wheels, B2, slotted shaft, C2, and intermediate gear wheels, W R N and E, with the latter engaging with the toothed or geared rack bar, K, of the lathe bed, when all combined and arranged together so as to operate substantially in the manner and for the purpose described.

Second, In combination with the above, the friction clutch, U, or its equivalent, connected through its loose gear wheel, T, with the pinion wheel, P3, of a screw shaft, M3, screwing into and through the lug, N3, of the sliding lathe rest frame, A3, substantially as described for the purpose specified.

Third, The combination of the divided nuts, I3, L3, and thumb screw, H3, with the two sections, C3, and D3, of the tool rest frame, A3, substantially as and for the purpose described.

60,951.—CURCULIO TRAP.—Jeremiah Smith, New Market, Ohio.

I claim the impervious elastic joint, D a b, connecting the two parts of the trough, A B, so as to permit its expansion as set forth.

60,952.—CHURN.—Zealous Sperry, Potter's Corners, Pa.

First, I claim the lever, E, slide, D, and guide, C, combined in relation with each other and with the spirally grooved dash rod, B, substantially as herein set forth for the purpose specified.

Second, The arrangement of the pivoted stud or spur, i, and the pin, g', with reference to each other and with the spiral groove, h, of the dash rod, B, whereby the said stud or spur may be removed from the groove, h, when desired, substantially at herein set forth for the purpose specified.

Third, The construction of the lower portion of the spirally grooved dash rod, B, with a hinged or pivoted section, c, arranged in relation with the slot or socket e, thereof, substantially as herein set forth, for the purpose specified.

60,953.—MAGNETIC LOCKS.—L. C. Springer, Chicago, Ill.

First, I claim unlocking a safe or withdrawing the bolts thereof by closing and opening an electro-magnetic circuit passing through a series of movable or adjustable points, substantially as and for the purposes set forth.

Second, I claim unlocking and adjusting the said movable points in said electro-magnetic circuit by means of a corresponding series of auxiliary circuits, substantially as described.

60,954.—DOOR AND GATE SPRING.—James Stephenson, Canandaigua, N. Y.

I claim the spring, C, and pintle, D, applied to the door or gate as described, in combination with the lever, F, and roller, G, or other circular bearing fixed to the stationary frame, when said parts are arranged and operate in the manner and for the purposes herein specified.

60,955.—COMPOUND FOR SWEETENING, COLORING AND FLAVORING TOBACCO.—Frank W. Sterry, Morrisania, N. Y.

I claim a compound for sweetening, flavoring and coloring tobacco, which is made of the aforesaid ingredients in about the proportions herein set forth.

60,956.—MODE OF STORING PETROLEUM AND OTHER LIQUIDS SO AS TO PREVENT LOSS FROM FIRE.—Simon Stevens, New York City.

I claim the mode herein described for the storing of petroleum or other similar inflammable liquids, so as to prevent accident by fire.

60,957.—COMPOSITION PASTE OR CEMENT FOR ROOFING.—R. B. Stevenson, York Township, N. Y.

I claim the compounding of burnt brick or well burned clay with asphaltum or coal tar, thereby forming a composition paste or cement.

60,958.—GLUE POT.—Henry C. Stewart, Cincinnati, Ohio.

I claim the parts, B c d d' and g, or their equivalents, constructed as above described and for the purpose set forth.

60,959.—CLAMP.—William Strevell, Jersey City, N. J.

I claim the improved clamp herein described, the same consisting of two jaws, A B, straps or clasps, D, and wedge strip, E, when all combined together, substantially in the manner and for the purpose described.

60,960.—BURGLAR ALARM GUNS.—P. Swisher, Versailles, Ohio.

First, I claim in the construction of a burglar-alarm gun, the combination of the fixed barrel, No. 1, and the revolving barrels, 2 and 3, with the breech pin, C, for firing simultaneously in different directions, substantially as and for the purposes herein described.

Second, I claim the breech pin, C, having the central longitudinal hole, c, the transverse hole, n, and the annular grooves, e, communicating with the vent of the upper barrel, No. 1, and the bores of the revolving barrels, No. 2 and 3, all arranged and operated substantially as and for the purposes herein described.

Third, I claim also the outside powder pan, h, for lighting a candle or lamp when the gun is fired, in the manner herein specified.

69,961.—WHEEL TOY.—John Syrcher, Buffalo, N. Y.

I claim attaching the string, F, to the india-rubber or other elastic block, E, in the manner and for the purposes described.

60,962.—BLACKING BOX HOLDER.—George W. Taylor, Springfield, Vt.

I claim a blacking box holder composed of two parts, A B, and a spiral spring, C, fitted together and arranged substantially in the manner as herein shown and described.

60,963.—BOAT DETACHING TACKLE.—J. R. Taylor, New York City.

I claim connecting and detaching a boat from the end of a rope by the combined use of the bars and cam or eccentric lever and the end of the rope passed or reeved through or between them, substantially as described.

60,964.—BOAT DETACHING TACKLE.—James R. Taylor, New York City.

I claim the combination of the hook and lever or weight pivoted to the holding head, and the block hook and its roller with the lugs on the holding head for the purpose of closing the space between the point of the hook, C, and the holding head, and for opening said space by swinging back said hook, C, substantially as described.

60,965.—BOAT-DETACHING TACKLE.—J. R. Taylor, New York City.

I claim the combination of the two hinged pieces, A B, with their projecting portions, c d e f, constructed, arranged, and operating together as and for the purpose set forth and described.

60,966.—BOAT-DETACHING TACKLE.—J. R. Taylor, New York City.

I claim, in combination with a hook used in a boat-detaching apparatus, a reinforce, or secondary hook, e, which catches under a solid portion of the head and thus relieves the pivot of the hook, or makes a safety connection should the pivot or the hook give way, substantially as described.

And I claim, in combination with the hook and its reinforce, an eccentrically formed tripping lever, that is aided in being tripped or removed by the pressure of the hook upon its curved edge, substantially as described.

60,967.—MEANS FOR ATTACHING ELASTIC TIPS TO LEGS OF FURNITURE.—E. S. Torrey, New York City.

I claim the combination of the socket, B, and conical leg, a, with the tip, f, substantially as and for the purposes herein set forth.

60,968.—MANUFACTURE OF GLUE.—George Upton, South Danvers, Mass.

I claim, in the manufacture of glue the process of subjecting the gelatine as matters to the action of steam, substantially as set forth.

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60,969.—HOOP SKIRT.—Hunneville Vincent, New York City, assignor to Hugh B. Brown, Brooklyn, N. Y.

I claim the arranging of the wires or hoops in such a manner that each hoop crosses or intersects itself once or more in its passage around the skirt, substantially as and for the purposes herein set forth.

60,970.—DOOR LOCK.—Rudolph Vollschwitz (assignor to himself and J. J. Schlaepfer), New York City.

I claim the mortices, g, in the tumblers, D, to operate in combination with the flat notched bit of the key, nuts, E, and bolts, C, substantially as and for the purpose described.

60,971.—GRANARY.—James Walsh, Valley Town, Ill.

I claim the granary and measurer, constructed of removable parts, substantially as described and represented.

60,972.—HOLLOW AUGER.—Joseph Ward, New York City.

I claim, First, The arrangement within the case, A, of the cutter stocks, B, constructed with discharge throats, C, and adapted for adjustment by means of the cam, E, and guides, a, as and for the purposes specified.

Second, I claim the within-described tool, adapted for cutting tenons and boring holes simultaneously, constructed and operating in the manner and for the purpose specified.

60,973.—MECHANISM FOR OPERATING DIES.—Hervey Waters, Northbridge, Mass.

I claim the combination with an eccentric hammer, crank press, or other similarly operating machine or machines of a means or system of mechanism by which the action of the machine or machines may be controlled substantially as set forth when such system of mechanism is so connected with the machine or machines as not to enter into the active operating structure thereof.

60,974.—LOCK AND KEY.—H. B. Weaver, Hartford, Conn.

I claim, First, The combination of the two spindles, D and D', the bolt, B, plate, C, and the tumblers, F, or their equivalents, the whole being constructed, arranged for joint operation, and applied to a lock case, substantially as and for the purpose herein set forth.

Second, The combination of the above and the fence, k', the whole being constructed, arranged, and operating as described.

Third, The bell crank, tumbler levers, F, hung to the spindle, D', and arranged in respect to the recess, k, of the plate, C, substantially as described.

Fourth, The tumblers, F, arranged in respect to the slot, l, in the stem of the handle, E', as described.

Fifth, The slot in the tubular stem of the handle, E' in combination with notches, p, in the edges of the key.

60,975.—RECTIFIER FOR STILLS.—A. Werne, New York City.

First, I claim the spiral channels formed in the covering plate, C, and in the box, B, by the spiral flanges, d and g, respectively, substantially as and for the purpose herein shown and described.

Second, I claim the annular plate, b, made substantially as and for the purpose herein shown and described.

Third, I claim the combination of the plate, b, box, B, and cooling cover, C, with the rectifier, A, substantially as and for the purpose herein shown and described.

60,976.—CULTIVATING HOPS.—E. A. Wightman and W. C. Williams, Livingstonville, N. Y.

We claim the sliding rod, B, arranged with the poles, A, as shown, adapted to be drawn therefrom when desired, substantially as represented and described.

60,977.—CORN HUSKER.—J. F. Winchell, Springfield, Ohio, assignor to himself and George C. Steele.

I claim the corn husker, consisting of the metal plate, A, and the strap, B, made adjustable in size, when constructed and arranged as herein shown and described.

60,978.—CHAIR.—G. C. Winchester and M. V. B. Howe (assignors to C. and G. C. Winchester), Ashburnham, Mass.

We claim combining the seat, a, with the stationary stool or base, b, by means of ball and socket joints, arranged not only to act as hinges but otherwise, substantially as described.

Also combining with such arrangement or construction, the spring, i, fixed to the bar and bearing against the rear part of the seat, substantially as shown and described.

Also the combining of the ratchet bar, pawl plate, shaft, and cam, when arranged to lock the seat in horizontal or inclined position, substantially as set forth.

Also, forming each side rail, f, and its leg, p, from a single strip of wood bent into shape, substantially as shown and described.

60,979.—CONSTRUCTION OF ORDNANCE.—W. E. Woodbridge, Little Falls, N. Y.

I claim, First, The employment, in the structure of cannon, of helices of wire of reversed obliquity, applied one over another, and brought into union by the intervention of a more fusible metal, employed as a solder.

Second, I claim, in general terms, the construction of cannon, substantially as herein described, modifying the selection and use of materials as herein set forth.

Third, I also claim the application of the mode of construction herein described, to tubes other than cannon, when the mechanical requirements are similar.

60,980.—BRIDLE BIT.—L. D. Woodmansee, Dayton, Ohio.

I claim the combination of the rigid bars, A and B, jointed directly to the mouth piece of a bridle bit, and operating in the manner substantially as and for the purpose described.

60,981.—GRATES.—Charles J. Woolson, Cleveland, Ohio.

I claim the tipping frame, A, provided with journals and bearings, B, in combination with the shackle or grate bar, D, arms, E, and link, O, and duplicate bearings, S.

60,982.—CULTIVATOR PLOW.—S. A. Wray, Greenfield, Ind.

I claim the combination of the beam, B and B', elastic plate, D, and hinge joint, E, with a device for retaining the beam in position, substantially in the manner set forth.

60,983.—WATER WHEEL.—Anthony Wrealsh and William Burns, Springfield, Ohio.

We claim, First, The buckets, D, when constructed with two or more faces, d and d', upon different radial planes, substantially as set forth.

Second, Constructing the inner set of concentric buckets or faces of the same bucket, d and d', shorter than the outer set, substantially as and for the purpose set forth.

Third, The combination of the guide wheels, E, intermediate plate, F, and gate ring, H, when constructed and arranged substantially as set forth.

Fourth, The raised crown of the intermediate plate, F, as arranged in relation to and serving as a bearing for the guide ring, H, substantially as set forth.

Fifth, The plate, F, when constructed and arranged between the guide wheel, E, and gate, H, substantially as and for the purpose set forth.

Sixth, The elevated bush, G, supported upon braces, resting upon the crown of the intermediate plate, F, and within the guide ring, H, substantially as and for the purpose set forth.

60,984.—COMPOSITION OF GLUE OR GELATINE AND OTHER MATERIALS CALLED DUROGEL.—Henry Wurtz, New York City.

I claim the combination of bichromate of potash with ordinary glue or gelatine, in the manner and for the purpose substantially as described in the foregoing specification.

60,985.—HOLLOW AUGER.—Emanuel Young, Amanda, Ohio.

I claim, as an article of manufacture, the hereinbefore-described tool, formed with the knives, C and E, attached to the hollow tapering body, B, formed with the shank, A, for attaching the tool to a brace, substantially as described.

60,986.—IMPONDERABLE FLUID AND MODE OF GENERATING THE SAME.—Martin Ziegler, Mulhouse, France.

I claim, First, Producing a new imponderable fluid in the manner and by the means herein set forth and described.

Second, The combination of two substances, the one containing azote, and the other containing carbon, in the manner substantially as herein described, so as to generate an imponderable fluid, and to excite or produce a current of the same, as and for the purposes set forth.

RE-ISSUES.

2,430.—PROCESS FOR PURIFYING METALLIC OXIDES.—Alfred Monnier, Philadelphia, Pa. Patented March 21, 1865.

I claim the treatment of metallic oxides for their purification, substantially as herein set forth.

2,431.—REFINING HYDRO-CARBON OILS AND UTILIZING WASTE PRODUCTS THEREFROM.—Henry Pemberton, Alleghany City, Pa. Patented Aug. 2, 1859.

I claim, First, Receiving the sulphuric acid contained in the residuum of the process of refining coal oil, petroleum and other hydro-carburets, by exposing the residuum, which is a compound of acid and tarry matters, to the combined action of water and heat whereby, under the influence of the high temperature, the attraction of the tarry matters for the acid is overcome by the superior affinity of the acid for the water, so that the acid separates itself from the tarry matter, and dissolves in the water, from which it may be obtained, in a concentrated state, and purified by various means, substantially as hereinbefore described.

Second, Purifying the dilute sulphuric acid recovered from the residuum which results from the refining of coal oils, petroleum and other hydro-carburets, by repeated processes of concentration and dilution with water, whereby the coloring matter is separated, and may be removed, substantially as hereinbefore described.

Third, The use of the sulphuric acid recovered from the residuum resulting from the refining of coal oil, petroleum and other hydro-carburets, for the decomposition of salt, in the production of sulphate of soda, as a step in the manufacture of soda ash.

2,432.—DRYING APPARATUS.—Edward Y. Robbins, Cincinnati, Ohio, assignee by mesne assignments of himself. Patented July 19, 1864.

I claim, First, So arranging the drying chamber, and drum or flue, B, and the furnace or stove for heating the wash water, that the drying chamber shall be heated by the surplus heat passing from the furnace or stove through a drum or flue, B, placed in the drying chamber, substantially as set forth.

Second, The application of a condenser to a drying chamber as above described, or any equivalent arrangement for producing the same effect, substantially in the same manner.

Third, I claim the netting when placed over the drum or flue to catch the clothes in case of falling, and thus prevent their being burned, the same being arranged substantially as set forth.

2,433.—LAP JOINT.—Henry Underwood, New York City. Patented Feb. 9, 1858.

I claim the union of the plates or straps, b, with the rivets, a a', which pass through outer and inner ends, A B, of the belt, substantially as and for the purposes described.

2,434.—MACHINE FOR MAKING NUTS.—William E. Ward, Port Chester, N. Y. Patented Oct. 7, 1856.

I claim as a new and as my invention, the two punches arranged side by side, and operated substantially as described for punching the central hole, cutting off the blanks from the bar, and discharging the same, substantially as described, in combination with the two holes or two dies, so that a hole is punched in the bar for another nut during the continued motion of the punch to discharge the nut which was cut off during the previous part of the same motion.

I also claim in combination with the punching and cutting mechanism either without or with the mandrel, or its equivalent, for entering the central hole of the nut blank, the employment of the spring jaws, or the equivalents thereof for transferring the nut blank from the die to the mandrel and there holding it until the mandrel enters the hole, substantially as described.

I also claim the mandrel for holding the nut blank in combination with the swaging surfaces by which the faces of the nut are formed, substantially as described.

I also claim in combination with the mandrel for holding the nut blank substantially as described, the hammers for hammering or swaging the edges of the nut, substantially as described.

And finally I claim the combination of the swaging surfaces for forming the faces of the nut with the hammers for forging the edges of the nut, substantially as specified, and for the purpose set forth.

2,435.—HEATING STOVE.—William A. Barlow, Elkhorn, Wis. Patented June 3, 1862.

I claim the base, A, composed of top and bottom plates only so formed and united as to inclose a hollow or space, under the whole body of the stove, and occupied throughout by the products of combustion in passing from the descending to the ascending flue or flues, substantially as and for the purposes herein specified.

I also claim the combination and arrangement of the projecting base, A, composed of top and bottom plates inclosing a space, the projecting top, C, similarly composed of top and bottom plates, and the pipes or flues, E E, and F, outside of and distinct from, the body of the stove, substantially as and for the purposes herein set forth.

In combination with the above, I also claim the dividing plates, a a, substantially as and for the purpose herein described.

2,436.—HEATING STOVE.—William A. Barlow, Elkhorn, Wis. Patented June 3, 1862.

I claim a heating stove having a double projecting top and an opening therein of the full or nearly full size of the interior of the stove body, and closed by a removable cover, substantially as and for the purposes herein specified.

In combination therewith I also claim a top, C, made of top and bottom plates with a heat-circulating space between them and projecting beyond the body of the stove sufficiently to admit flues or pipes extending from the top to the base of the stove, outside of the stove body, substantially as and for the purpose herein set forth.

2,437.—CAPSTAN FOR STEAM BOATS.—John Schaffer, St. Louis, Mo. Patented Oct. 21, 1856.

I claim the arrangement of the capstan barrel, A, with the wheels, e f, 6, 5, 4, 3, 2, and 1, provided with suitable shafting, when said wheels and shafting are used for connecting and rotating a capstan barrel by an auxiliary engine, said capstan and auxiliary engine being placed forward of the steam boilers on the bow of the boat, substantially as herein described and for the purpose set forth.

2,438.—RAKE FOR HARVESTER.—C. Aultman, Canton, Ohio, assignee by mesne assignments of S. A. Lindsay. Patented Dec. 11, 1860.

First, I claim a support for the revolving rake and reel shaft attached to and moving with the platform of a binged bar machine.

Second, A support for the revolving rake and reel-shaft, attached to and moving with the hinged platform, in combination with a hinged platform suspended to the main frame.

Third, A support for the revolving rake and reel shaft, attached to and moving with the hinged platform in combination with the universal joint for drawing said shaft, and conforming the rake and reel to the movement of the platform.

Fourth, An automatic revolving rake, with a universal joint for driving it.

Fifth, The combination of a revolving rake and reel, a hinged platform, and a jointed tumbling driving shaft.

Sixth, A support for the revolving rake and reel shaft attached to and moving with the hinged platform in combination with a driving mechanism, which adapts itself to the rising and falling of the platform in passing over uneven ground.

Seventh, The combination of a revolving rake and reel, with a mechanism for adjusting the rake and reel together, with the cutting apparatus and platform so arranged that the driver can operate it without stopping the machine.

Eighth, The combination of a floating finger beam machine, a revolving rake and reel, so combined and arranged that the rake and platform shall rise and fall together while reaping, and that the rake and platform may be readily removed for converting it into a mower.

Ninth, The combination of a hinged platform and a continuously revolving rake shaft, support located on said platform, between the center of the draft frame and the outer divider.

Tenth, A standard or support, which sustains the sweep rake above the draft frame or driving wheels thereof, said standard or support being mounted on the hinged platform.

Eleventh, In a harvesting machine, which has its cutting apparatus hinged or jointed to the main frame, in such manner as allows it to conform at both ends to the undulations of the ground, and has a rake support mounted on said jointed platform, I claim so constructing and arranging the several parts that the support of the rake can occupy a position outside of inner drive wheel, or a position which is between the point of suspension of the platform and the outer divider, and so that said platform can also be hung or suspended below the draft frame.

Twelfth, An inclined rake shaft, a platform and spring, so arranged that the rake head shall be elevated sufficiently to pass above the main frame by the mere inclination of the axle, and shall be guided in passing across the platform by the sliding of the rake teeth on the platform, thereby dispensing with the use of a cam for elevating or guiding the rake.

Thirteenth, A continuously revolving rake, in combination with a shaft inclined toward the platform for forcing the rake down to the platform, and then elevating it up and out of the way of the wheels and main frame, in its revolution.

2,439.—HARVESTER.—C. Aultman, Canton, Ohio, assignee by mesne assignments of S. A. Lindsay. Patented Aug. 2, 1859.

First, I claim an automatic rake, delivering the grain in the arc of a circle in combination with a hinged platform.

Second, The combination of a revolving rake and reel, and a hinged platform.

Third, The combination of a revolving rake and reel, with a hinged platform suspended from the main frame.

Fourth, In a harvester, having a revolving rake and reel, I claim suspending the hinged platform to the main frame at one or more points between the driving wheels.

Fifth, The combination of a revolving rake and reel, with a hinged cutting apparatus, in such a manner that the said cutting apparatus can be raised and lowered without changing the relative position of the rake and reel to the platform.

Sixth, The employment of radial reel and rake arms attached to the central head or axis, by independent hinges or pivots for each radial arm.

Seventh, Attaching the beaters and rake heads at such an angle with a radial line, that the rake heads and beaters shall approach to and pass over the cutter in a line nearly parallel to the cutter when the axis of the rake and reel is located in the rear of the cutter bar.

Eighth, The boxes or bearings, K K, for carrying the pivoted radial arms in combination with the central revolving hub.

Ninth, The combination of a revolving rake and reel, a vibrating frame or its equivalent, and a hinged platform.

Tenth, Arranging the revolving rake and reel supported to vibrate about a gear center, so that the raising or lowering of the cutter does not interfere with the operation of the driving mechanism.

Eleventh, The combination of a revolving rake and reel apparatus which is supported between the driving wheels and a hinged platform by means of an intermediate connecting piece for the purpose of conforming the movements of the rake to the platform in passing over uneven ground.

Twelfth, The combination of a quadrant platform, a hinged finger beam, and a frame supported on two wheels.

Thirteenth, The combination of a quadrant platform and a hinged finger beam suspended from a frame supported on two wheels.

Fourteenth, The combination of a quadrant platform, a hinged finger beam, a two-wheeled frame, and a rake moving in the arc of a circle.

2,440.—CORN HARVESTER.—George Geer, Douglas, Ill. Patented June 2, 1863.

First, I claim the endless chain, M, provided with pivoted teeth, n, substantially as and for the purpose set forth.

Second, The serrated wheels, f f', arranged and applied to operate as and for the purpose specified.

Third, The cutter, U, operated by the treadle, n', and arranged and applied as and for the purpose set forth.

Fourth, The bar or guard, l, arranged and applied underneath the cylinder, H, substantially as and for the purpose set forth.

Fifth, The plate or guard, N, attached to the plate, J, as and for the purpose specified.

2,441.—FRUIT BOX—Nicholas Hallock, Flushing, N. Y. Patented Sept. 7, 1858.

I claim, First, A fruit box constructed of thin sheets or strips of material which form the body and bottom of the box, and secured together, substantially as described and specified.

Second, I also claim in combination with a box constructed of thin sheets or strips of material, substantially as described, so arranging the handle as that it may be attached to and folded closely within the box substantially as described and specified.

Third, I also claim defining the outline or shape of the box by means of grooves in the material forming the box, substantially as described and specified.

Fourth, I also claim in fruit boxes constructed substantially as described, making the bottom so that boxes may be placed one above the other without injury to the fruit in the one below it and for better ventilation of the fruit, substantially as described and specified.

2,442.—SPRING HOLDER FOR WIPING CLOTHS.—Henry Johnson, Chicago, Ill., assignee by mesne assignments of W J. Johnson. Patented Feb. 21, 1860.

I claim the spring holder for cloths consisting of two or more curved spring fingers, arranged substantially as and for the purposes described.

2,443.—NICKING SCREW HEADS.—George L. Morris, Taunton, Mass. Patented June 12, 1866.

I claim the improved nicked screws made either by casting or cutting, having the said nicks flaring at their outer ends and with the separating part between strengthening the head, the two nicks being made on the line of one and the same diameter of the screw head, all as and for the purposes specified.

2,444.—MACHINE FOR MAKING CLINCH RINGS.—G. M. Patten, Bath, Me. Patented May 2, 1854.

I claim the combination of the retainer and clearer or part, G, and its springs, or the equivalent thereof, and the elastic seat, H, with the dies, E and F, the upper die being provided with mechanism for operating it, as described.

I also claim the combination as well as the arrangement of the retainer or part, G, and its springs, or their equivalent, with a pinch and die or dies, E F, the said part, G, being to operate therewith, substantially as described.

2,445.—BREECH-LOADING FIRE-ARMS.—William Mont Storm, New York City. Patented July 8th, 1856.

First, I claim a breech piece, hinged at its front end, and swinging upward and over, substantially as described, in combination with a stationary, or fixed recoil-bearing at its rear end, having the characteristic features of being firmly connected with the barrel, and being extended above the line of the bore of the barrel, substantially as and for the purpose set forth.

Second, I claim cutting away the recoil-bearing surface, substantially as described for the purpose set forth.

Third, I claim the internal bolt, e, operated by a positive motion to lock in place the movable breech piece of a breech-loading fire-arm during the fall of the hammer, or its equivalent, substantially in the manner described.

Fourth, I claim forming a space or recess between the lower side of the breech piece and the seat into which it shuts, for the accommodation of dirt which would otherwise prevent the descent of the breech piece, as hereinbefore fully explained.

2,446.—BREECH-LOADING FIRE-ARMS.—William Mont Storm, New York City. Patented July 8, 1856.

First, I claim a chambered breech piece, when such breech piece is hinged at its forward end to the barrel, and arranged to swing over, substantially as described for the purpose set forth.

Second, I claim, in combination with the barrel and movable breech, a packing tube or ring, arranged to slide within the breech piece, and formed at the front end to enter the barrel, so that by the force of the discharge the said tube will be forced forward and into the barrel, and made to pack the joint between the barrel and breech piece to prevent the escape of the explosive gases.

Third, I claim the manner, substantially as shown and described, of coupling the bolt, e, with the tumbler, so that although said bolt is operated by a positive motion, as described, the lock can be removed regardless of the barrel and bolt, as hereinbefore set forth.

DESIGNS.

2,533.—TRADE MARK.—Charles C. Buckley and Louis Dovell, New York City.

2,534.—COACH LAMP.—E. R. P. Cowles (assignor to C. Cowles & Co.), New Haven, Conn.

2,535.—STOVE.—Harrison Eaton, Amherst, N. H.

2,536.—MEDALLION.—Orion Frazee, New York City.

2,537 and 2,538.—ROUND COMB.—W. S. Minges, New York City. Two Cases.

2,539.—HANDLE OF A FORK OR SPOON.—John Polhamus, New York City.

2,540.—HANDLE OF A CASTER.—Horace C. Wilcox (assignor to the Meriden Britannia Co.), West Meriden, Conn.

2,541.—CASTER FRAME.—Horace C. Wilcox (assignor to the Meriden Britannia Co.), West Meriden, Conn.

EXTENSIONS.

MACHINE FOR DRILLING STONES.—Joseph J. Couch, Brooklyn, N. Y. Letters Patent No. 9,415, dated November 23, 1852.

I claim the improvement of making the drill rod to slide through the piston rod, substantially in the manner above set forth.

And I also claim the combination of the rocker lever, K, the wedge, M, the bolt, P, within the lever, the two cam plates, N O, the spring catch, Q, the spring and the two projections, c d, as applied to the drill shaft, the carriage or block, I, and the slide ways thereof, and made to operate together, and to actuate the drill, substantially in the manner as hereinbefore set forth.

KNITTING MACHINE.—Daniel Tainter, Worcester, Mass. Letters Patent No. 9,435, dated November 30, 1852.

I claim to so combine a draft and take-up roller and mechanism for revolving it, with a rotary series or set of needles and other mechanism of the above-mentioned peculiar kind for knitting, that such draft roller shall rotate simultaneously, or with the same velocity with such series of needles, so as to prevent the longitudinal rows of stitches from being produced in helical lines, and the evil consequences resulting to the fabric therefrom.

I also claim the arrangement of the draft and take-up mechanism, in connection with the knitting mechanism supported by two separate frames, A T, and also their connection with the mechanism for producing an equal and simultaneous rotation of these frames, A T, all substantially as described, whereby there shall not only be no connection between the frames, A T, to extend through the fabric, but no projection from the frame, A, to come in contact with the presser, stitch wheels, and cam bar, or their respective supports, during the simultaneous and equal rotations of both or either of the said frames, A T.

GRAIN SEPARATOR.—John R. Moffitt, Chelsea, Mass. Letters Patent No. 9,432, dated November 30, 1852. Reissue No. 540, dated March 23, 1858. Again reissued No. 716, B 1, May 17, 1859.

I claim, in combination with a receptacle in which the tailings are deposited by the winnowing apparatus, the arrangement of the screw elevator, O, in relation to the thrashing cylinder, for the purpose of returning the tailings to be thrashed, as set forth.

MORTISING MACHINE.—Joseph Guild, Buffalo, N. Y. Letters Patent No. 9,431, dated November 30, 1852. Reissue No. 333, dated December 11, 1855.

I claim, First, The sliding wrist, o, connected with the chisel, and also with the driving power, in the manner described, in combination with the mechanism described, or its equivalent, for sliding said wrist, so that the operator can, during the motion of the machine, vary the depth of cut of the chisel, or cause it to be suspended without disconnecting the driving power.

Second, The combination in a mortising machine, substantially as described, of the treadle and opposing spring or weight connected to a toggle, one end of which being pivoted to the frame, the other is pivoted to a sliding wrist upon a vibrating arm, actuated by the power, the said wrist being slid out and in upon the arm with varying power and speed, by the action of said toggle and its attached weight or spring and treadle, as explained, or their equivalents.

MACHINERY FOR MAKING PILLS.—Erasmus A. Pond, Rutland, Vt. Letters Patent No. 9,455, dated Dec. 7, 1852.

I claim, First, Molding or forming pills by means of two cylinders, B B, having each a number of recesses, a a, in its periphery, the recesses in one cylinder matching with those in the other, and each matching pair forming a mold of the required form of the pill, the said cylinders revolving in opposite directions, and the pill mass being conducted between them, substantially as herein described.

Second, The bands, I I, of india-rubber, or any sufficiently elastic material passing around or partly around the mold cylinders, for the purpose of expelling the pills from the recesses, a a, after the molds are open, substantially as herein set forth.

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CONTENTS.

TOOLS AND APPARATUS:—Taylor's indigo grinding mill; Rawlinson's indigo grinding mill.

COLORS.

WHITES:—White lead, ceruse and flake white; Spanish, or bougival white; gypsum, or plaster of Paris; white of Troyes, or white chalk.
BLACKS:—Ivory black; lamp black; charcoal blacks.
REDS:—Vermillion; minium, or red lead; carmine lake; Spanish brown; other reds.
YELLOWS:—Yellow ochre; massicot; chrome yellow; Turner's or patent yellow; orpiment; Naples yellow; yellow of antimony; yellow pink.
BLUES:—Prussian blue; indigo; ultramarine; smalt, zaffre, azure, Saxon blue, or enamel blue; blue verditer.
GREENS:—Verdigris; Italian or Verona green; Saxon or Hungary green; Scheele's green; Schweinfurt green; Brunswick green; green verditer; green lake, or Venetian green.
BROWNS:—Umber; new brown, discovered by Mr. Hatchet.
COMPOUND COLORS, OR COLORS ARISING FROM MIXTURE:—Light gray, buff, silver or pearl gray, flaxen gray, brick color, oak-wood color, walnut-tree color, jonquil, lemon yellow, orange color, violet color, purple, carnation, gold color, olive color, lead color, chestnut color, light timber color, flesh color, light willow green, grass green, stone color, dark lead color, fawn color, chocolate color. Portland stone color, to imitate mahogany, to imitate wainscot, to imitate satin wood.
OILS:—Oil of spike, oil of lavender, oil of poppies, nut oil or linseed oil, oil of turpentine, fat oils, drying oils, pilchard oils.
VARNISHES:—Shell-lac varnish, turpentine varnish, linseed oil varnish, copal varnish, gold-colored copal varnish, camphorated copal varnish, copal varnish in imitation of tortoise shell, amber varnish, caoutchouc, or gum elastic varnish, mastic varnish, varnish for violins, etc., white hard varnish, varnishes for paling and coarse wood work, varnish for colored drawings, varnish for glass, black varnish for old straw or chip hats, varnish for drawings and card work, changing varnishes, mordant varnishes.
GENERAL OBSERVATIONS ON VARNISHES.
POLISHES:—Varnish polish, polish for dark-colored woods, polish for Tunbridge ware, goods, etc.; carvers' polish, French polish, water-proof polish, finishing polish.
GILDING MATERIALS:—Fine gold powder, color-hightening compositions, mosaic gold, Dutch or German metal, ethereal solution of gold, gold oil color or size, gold water size, preparatory size, white coating, coloring yellow, vermeil.
MISCELLANEOUS MATERIALS:—Painter's cream, rotten stone, glue and isinglass, common size.
GRINDING AND WASHING COLORS.
CLEANLINESS IN WORKING.
PRACTICE OF PAINTING:—Painting in distemper, painting in milk.
PRACTICE OF VARNISHING AND POLISHING;—French polish, waxing.
PRACTICE OF GILDING:—Gilding carved wood with water size; gilding plaster or marble with water size; gilding wood in oil; to gild steel; to gild copper, brass, etc.; gilding glass and porcelain; gilding leather; gilding writings, drawings, etc., on paper or parchment; gilding the edges of paper.
ON LACQUERING:—Lacquer for brass; lacquer for philosophical instruments; gold-colored lacquer for brass watch cases, watch keys, etc.; to make lacker of various tints; to clean oldbrass work for lacquering.
BRONZING.
JAPANNING:—Colors required in japanning; to prepare a tortoise shell japan ground by means of heat.
FOILS:—To color foils.
FISH-OIL COLORS:—To prepare the oil; gain by the above process; preparation and cost of particular colors; subdued green, lead color, bright green, stone color, brown red, chocolate color, yellow, black.
GLASS STAINING:—No. 1, flux; No. 2, gray flux; No. 3, flux for carmines and greens; the various colors.
BLUES:—Indigo blue, turquoise blue, azure blue, deep azure blue, sky blue for the browns, violet blue for ground color, lavender blue for ground tint.
GREENS:—Emerald green, bluish green, grass green, dragon, pistache and olive green.
YELLOWS:—Sulphur yellow, fixed yellow for touches, yellow for browns and greens, deep yellow to mix with the chromium greens, jonquille yellow for flowers, wax yellow, fixed wax yellow, Nankin yellow for grounds, deep Nankin yellow, pale yellow ochre, deep yellow ochre, called yellow brown, brown yellow ochre, isabella yellow for grounds, orange yellow for grounds, brick red, deep blood red.
COLORS OF GOLD:—Hard carmine, pure purple, deep violet.
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Avis important. Les inventeurs non familiers avec la langue Anglaise, et qui préféreraient nous communiquer leurs inventions en Français peuvent nous addresser dans leur langue natale. Envoyez nous un dessin et une description concise pour notre examen. Toute communications recived in confidence.
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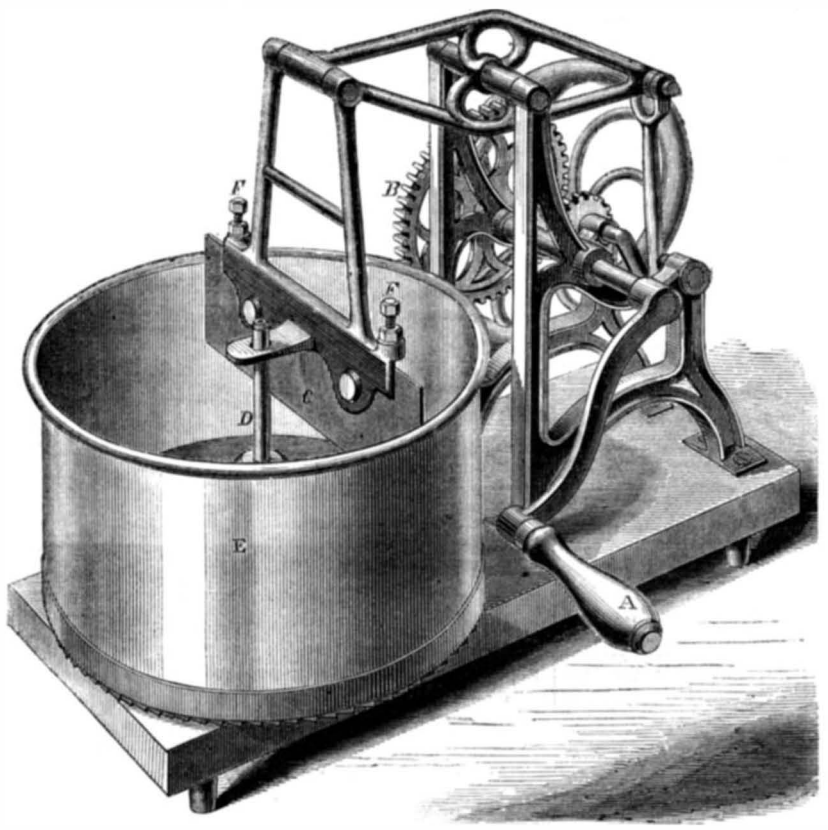
Improved Meat and Vegetable Chopper.

Not at the holidays alone, but at many other times, the business of mincing meat and vegetables is one which must engage the attention of the cook. Many object to the machines which grind instead of cutting, believing the process detrimental to the material to be eaten, and the use of the hand chopping-knife is wearisome and exhausting. The engraving represents one of those machines intended to obviate this labor and to insure a thorough and even chopping of the food.

As will be seen by the engraving, the contrivance is a simple machine secured to a wooden platform, which can be moved about or fastened permanently to a table. By turning the crank, A, the large gear, B is revolved, giving motion, by a pinion, to another crank on a shaft carrying a balance wheel.

To this crank is attached a connecting rod jointed to one end of a walking beam, to the other end of which is secured the knife, C, which has a reciprocating vertical movement guided by the fixed stud, D. The receptacle, E, is of tin or any convenient material, with a wooden bottom, and turns on the stud, D. The under outside edge of this vessel is a ratchet, by which it is rotated one tooth at every upward stroke of the knife, by a long pawl connected with a short crank on the shaft carrying the balance wheel. The difference between the large gear, B, and the pinion, gives four complete strokes to the knife, C, at every revolution of the handle, A. The knife may be adjusted, as it is shortened by grinding, by means of bolts passing through holes in the iron knife-frame and slots in the knife, C, and also by adjustable set screws, F.

The operation of the machine may be easily understood by a reference to the engraving. It appears to be well adapted to the purpose intended. The machines are built of different sizes, for families, restaurants, hotels, butchers, and bakers. It was patented May 23d, 1865, by L. S. Starrett, of Newburyport, Mass., at which place they are manufactured by L. S. Starrett & Co., to whom, or to Maxwell & Payson, 257 Front street, New York city, apply for rights to vend and manufacture.



STARRETT'S MEAT AND VEGETABLE CHOPPER.

Whitworth Ordnance.

Some time ago we described and illustrated Mr. Whitworth's plan for compressing steel immediately after its being run into molds for the manufacture of cannon, hollow projectiles, and various other articles Another patent has since been added to those previously taken out by Mr. Whitworth, and experiments are now being made at the Charlton street Works for perfecting this improved treatment of steel in making ordnance. A hydraulic press, capable of exerting a pressure of 2,000 tons, has been laid out for this manufacture. The steel manufactured at the Charlton street Works is all made in pots, and melted in coke furnaces; but the introduction of Siemens' gas furnaces is now under consideration, and will in all probability be effected at an early date. The results of experiments hitherto made of casting steel under great pressure, or rather of compressing steel in its liquid state, have been most satisfactory. The entire absence of air bubbles and spongy parts in the metal, and the strength of the steel so produced, give to these castings the same nature and character which steel acquires by the process of hammering or rolling. The precise method of this manufacture and the plan by which it is carried out is being kept secret as yet, until the first stages of experiment and study shall have been passed through.—*Engineering.*

In connection with the explanations and illustrations of the philosophy of waterspouts, lately given in the Scientific American, our readers will be interested in notices of three of these phenomena, from the Great Basin between the Rocky Mountains and the Sierra Nevada. Two of them are very recent. A waterspout burst on the city of Austin, Nevada, flooding the main street to such an extent as to destroy a number of houses. Another in El Dorado Cañon swept away large piles of wood and several wood-choppers with them. About two years ago, a waterspout in Esmeralda county, in the same state, burst upon a travelling carriage containing three persons, killing two of them outright, destroying the carriage, and fatally injuring one of the horses. These occurrences are characteristic of the country, having left their traces every where in the wild work of torrents among the hills.

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Further particulars on application. 1 tf os

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The first inquiry that presents itself to one who has made any improvement or discovery is: "Can I obtain a Patent?" A *positive* answer can only be had by presenting a complete application for a Patent to the Commissioner of Patents. An application consists of a Model, Drawings, Petition, Oath, and full Specification. Various official rules and formalities must also be observed. The efforts of the inventor to do all this business himself are generally without success. After a season of great perplexity and delay, he is usually glad to seek the aid of persons experienced in patent business, and have all the work done over again. The best plan is to solicit proper advice at the beginning.

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In Order to Apply for a Patent, the law requires that a model shall be furnished, not over a foot in any dimensions,—smaller, if possible. Send the model by express, pre-paid, addressed to Munn & Co., 37 Park Row, N. Y., together with a description of its operation and merits; also, remit the first Government and stamp fees, $16. On receipt thereof we will prepare the patent papers and send them to the inventor for examination, signature, and oath. Our charge for preparing the drawings and all the documents, with attendance to the business before the Patent Office, is $25, for the simplest cases, up to $35, and more, according to the labor involved. Our charges are always very moderate. When the patent is allowed, $20 more is paid the Government, making a total of $61 for the simplest case.

The model should be neatly made of any suitable materials, strongly fastened, without glue, varnished or painted. The name of the inventor should be engraved or painted upon it. When the invention consists of an improvement upon some other machine, a full working model of the whole machine will not be necessary. But the model must be sufficiently perfect to show, with clearness, the nature and operation of the improvement.

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When the invention consists of a medicine or compound, or a new article of manufacture, or a new composition, samples of the article must be furnished, neatly put up. Also, send us a full statement of the ingredients, proportions, mode of preparation, uses, and merits.

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If the device has been patented, the time and expense of constructing models, preparing documents, etc., will, in most cases, be saved by means of this search: if the invention has been in part patented, the applicant will be enabled to modify his claims and expectations accordingly.

Parties desiring the Preliminary Examination are requested to remit the fee ($5), and furnish us with a sketch or photograph, and a brief description of the invention.

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